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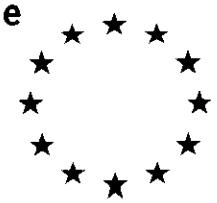

The challenges facing European society with the approach of the year 2000

Strategies for sustainable development in urban regions in Europe

European regional planning, No. 57

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STRATEGIES FOR A SUSTAINABLE PATTERN OF DEVELOPMENT OF URBAN REGIONS IN EUROPE

Summary

Regional and urban development policy is among the areas where integration of environmental considerations is of highest priority. The implementation of such considerations in urban development strategies will demand considerable revisions to be made in established principles and practices of planning and development, to be able to cope with the growing socio-economic and environmental challenges facing the ever-increasing share of urbanized area and population in Europe.

The document is a contribution to the discussion of what strategies are necessary and feasible to ensure a sustainable pattern of development of urban regions in Europe, in the face of the double challenge of restoring urban regions ' economic and welfare-producing capacity and the necessity to give preference to environmental concerns. An operational definition of sustainability is offered for the purpose at hand, emphasizing requirements placed by the eco-systems capasity to harbour human activity. Taking fully into account the composit socio-economic and environmental character of urban problems and policies, the document focuses on the relations between environmental problems and the spatial organization of urban built environment. Considerable attention is given to the questions of implementation and feasibility.

The overall picture of urban development in post-war Europe is one of substantial growth in both area and population of cities, leading to rapid urban change, often in unpredictable ways. Cities have spread to an extent that our definitions of a city, and the boundaries of urbanized areas, may rightly be questioned. This development is part of a general spatial restructuring of economic and social activity in Europe, impacting differently across country borders, between types of cities and intra-urban areas, and between social groups . The diverse map of urban Europe and the complexity of present and emerging tendencies give no clear base for the prediction of future change. Nevertheless the development of cities and urbanized areas in different European countries show many similarities, due to a number of common driving forces within the economic and technological development. Given the current trends, urban spatial expansion will hardly reach a "saturation level" within the not-too-distant future.

There has been a shift from "first generation" urban environmental problems, characterized by local damages due to concentrated emissions from production activity, to "second generation" problems originating from consumption rather than from production, from diffuse sources rather than from concentrated ones, and with global effects in addition to the local consequences.

The concept of sustainable development combines norms of justice and equity with an acknowledgement that nature 's ability to receive human-made encroachments and emissions is limited. The Brundtland commission points to the necessity of a substantial reduction in the energy use of industrial countries, in order to give room for technological development in the Third World, and at the same time avoid an irresponsibly high total global consumption of energy. This will have significant consequences for urban and regional development in industrial countries. A sustainable urban and regional development must secure:

* *A reduction of the city 's and region 's per capita energy use and emissions*
* *A minimizing of the conversion of and encroachments on natural ecosystems*
* *A replacement of "open-ended" flows where natural resources are transformed into waste, with "closed circuits".*
* *A sound environment for the city 's and region 's inhabitants.*

The four criteria reflect two different focal points within urban environmental policy: The city as a part of the larger natural ecosystems, and nature and environmental qualities within the city. If a sustainable development is to be achieved, it seems necessary to avoid further urban sprawl. Based on available knowledge, a concentrated urban development seems to be more in line with the sustainability criteria than a sprawling developmental pattern. However, a strategy for more compact cities should be cautious as not to decimate important elements of urban nature. At the regional level, a decentralized pattern of residence seems ecologically favourable, provided that the urban area per capita in each individual town or village is moderate.

Increasing urban road and parking capacity has environmental side effects which often outweigh the positive consequences of congestion relief. Although free-flowing traffic can contribute to lower emissions for each individual vehicle, increasing the space for cars usually results in more traffic. From a sustainability point of view, increased road and parking capacity in cities and urban regions is therefore problematic.

If a sustainable urban development is to be implemented, significant political, institutional, cultural and social barriers will have to be overcome. A sustainable urban development will require a strong coordination and control at the national level and binding agreements at the international level. Supranational and national strategies, however, rely heavily on the implementation at local levels within the frames of national policies. Current environmental policies in most European countries are still rooted in a "technocentric" view. However, the recommendations of the Brundtland report go beyond the traditional scope of "technocentric" environmental policies.

Several studies indicate that measures favourable to a more sustainable urban development may be quite controversial. Changed value priorities among people seem to be a basic requirement for a more nature- and environment-friendly course in urban development. Environmental strategies that have relatively strong support, may nevertheless be considered unlikely. Limitations on private mobility and the consumption of land for urban development will easily conflict economic interests aiming at the encouragement of consumer demand and the development of individual opportunity and mobility.

If urban planning for a sustainable development is to be feasible, sustainability must gain status as a main concern in society. Planning for sustainability must be oriented towards long-term and global goals, but should not rely solely on technical and instrumental rationality. A broad spectre of planning strategies should be employed in planning for a sustainable development, contingent on the concrete planning situation.

A "precautionary principle" for ecologically defensible decisions could be to choose those courses of action that, based on today's state of knowledge, minimize the negative impacts on the environment, and at the same time minimize the negative environmental consequences if the basis of knowledge should prove to be erroneous. Research and discussion should be directed to increase the insights into issues of relevance to a sustainable urban development.

1. Introduction

Regional and urban development policy is among the areas where integration of environmental considerations is of highest priority. The implementation of such considerations in urban development strategies will demand considerable revisions to be made in established principles and practices of planning and development. The document is a contribution to the discussion of what strategies are necessary and feasible to ensure a sustainable pattern of development of urban regions in Europe, in the face of the double challenge of restoring urban regions' economic and welfare-producing capacity and the necessity to give absolute preference to environmental concerns. The introduction gives an overwiev of the contents of the document, where i.a. an operational definition of sustainability is offered for the purpose at hand, and considerable attention is given to the questions of implementation and feasibility.

The political imperative to be drawn from the United Nations Rio-Conference in 1992, is the necessity that environmental and natural considerations be "internalized" into all policy areas. Obviously regional and urban development policy is among the areas of highest priority in this sense, being directly related to the main areas of environmental impact and concern; such as development of patterns of human settlement and urbanization, built environment and infrastructure, industrial location, extraction of natural resources, mobility and transport, and the use of water-systems and land. In fact, regional and environmental policy are complementary and interdependent to a degree that calls for coordination close to amalgamation (Hägerstrand 1993).

Moreover, the extensive spread of cities incorporating rapidly increasing shares of the national populations into urbanized areas, makes urban regions the predominant scenes of socio-economic problems and change in Europe. Dealing with future problems of European society in general, whether they are socio-economic, environmental or a mixture, therefore will have to take into consideration the total range of urban problems and its internal interactions, and must be based on the fact that Europe is now largely made up of networks of towns and cities.

It is extremely difficult to identify problems and challenges to be appointed general or typical traits of European city-regions and urban development. Variation and complexity is more pronounced than similarity, and what we see depends on the choise of level of analysis. However, some presently observed problems of urban development are often pointed at, like defects on the part of the regions' welfare producing capacity caused by impacts on household time-use, household economy and other aspects of daily life; the decay of infrastructure and of the physical fabric of urban neighbourhoods; segregation and concentration of social problems; and the generation of adverse environmental impacts due to excessive energy use and pollution from production, consumption and transport.

These traits are the outcome of simultanity and interplay of several processes (Castells 1993, Champion 1992, Hall 1993): 1) persistant, but shifting patterns of urban population growth (changes in migration patterns and intra-urban patterns of settlement), 2) socio-demographic changes (changes in age-pyramids of urban populations caused by migration, fertility decline and falling death-rates; changes towards smaller families and households, immigration), 3) growth of two-income households, 4) changes in income and consumer behaveour, growth of car-ownership, 5) industrial restructuring (industrialization and de-industrialization, growth of service-employment, changes towards an information-based economy), 6) technical

development (changes in production, transport and communication technology), 7) internationalization and growth of a global economy, 8) changes in locational conditions and patterns of establishhments and enterprizes (spatial segregation of labour and service markets), 9) changes in the spatial division of labour, 10) political and institutional changes (decentralization, privatization and deregulation of markets), 11) long-term economic restructuring (changes in organization and spatial patterns of production, changing labour markets, growth and persistance of unemployment). Matching of urban functions, notably housing, jobs, amenities and services, to changing socio-demographic and socio-economic structures, is growing increasingly difficult in many city-regions, as a result of inadequate funding as well as locational mismatch and overload.

The transformation of cities and urbanized areas is determined in pace and social impact by their particular relations to the socio-economic trends that to varying degrees affect the whole of Europe, most generally identified as i.a. restructuring and globalization of the economy and its underlying forces. The processes are assessed to affect differentially across space in manners that lead to new types of specialization and competition between cities and regions, and create new vertical and horizontal divisions of space. Even within cities and urban regions internationalization and the corresponding economic restructuring influences specific neighbourhoods and types of areas differently, promoting growth and repatterning of segregational processes as some areas for instance connect profitably to international networks and flows, while others become "victims" of differential impacts of "external" processes.

The outcome of these changes is increasing spatial disparities by indicators of economic performance, competitiveness, social wellbeing and social problems. The congregation of certain social groups in specific areas, and the cumulation of social problems in some of these areas are observed. These traits are reinforced by proliferating unemployment and tendencies of economic exclusion, the spread of lowpaid, insecure employment, and the fiscal and managerial problems facing local governments in their efforts to deal with incrasingly complex and costly problems cutting across the boundaries of their jurisdictions (Castells 1993, Gans 1993, Hall 1993, Marcuse 1993, Mingione 1993, Silver 1993). In very general terms "cities" seem to be moving in the same direction, the spatial outcome i.a. referred to as "divided cities", and one of the more severe social outcomes as the creation of a "new urban poverty" or an "urban underclass" (Castells 1993, Gans 1993, Weesep and Dielman 1993). The evidens so far is, however, based on little systematic comparative research, and it even exhibits important differences and great individuality by country and type of city or city-region.

Urban development in the industrialized world is characterized by excessive urban pressure on the carrying capacity of common eco-systems. The recommendations of the Brundtland report imply a challenge for a significant reduction of the energy use, emissions and waste production of urban areas. Strategies for a sustainable pattern of development of urban areas require that certain limitations to human activity, placed by environmental and resource considerations, are fully recognized as integral to planning and policy-making.

The operational implementation of such considerations in urban development strategies and policies must be based on a well-founded understanding of the concept of 'sustainable development' and of the concrete ways in which it relates to regional/spatial patterns and functioning of urban areas. The recommendations of the UN World Commission on

Environment and Development are acknowledged to demand considerable revisions to be made of today 's practice in the industrialized countries ' urban and regional planning and development.

The need for a responsible management of resources and protection of the environment has also been addressed in previous CEMAT documents, notably the European Regional/Spatial Planning Charter adopted at Torremolinos in Spain in 1983. The charter states that a rational use of land is necessary in pursuit of the basic goals for regional/spatial planning, namely:

* *Balanced socio-economic development of the regions*
* *Improvement of the quality of life*
* *Responsible management of resources and protection of the environment.*

The Torremolinos Charter also underlines that regional/spatial planning should be democratic, comprehensive, functional and oriented towards the longer term. However, the Charter was adopted four years before the Brundtland Commission launched its report "Our Common Future" and the consept of sustainable development was put on the political agenda. The challenges for spatial, regional and urban planning emanating from the objective of a sustainable development are therefore more or less absent in the Torremolinos charter.

In focus of this document is urban development in a broad sense; not only the individual town or city, but "the larger urbanized area", or the urban region. More specifically the document deals with aspects of urban development that affects the relations between towns/cities and their surrounding regions, in terms of spatial organization of built environment, infrastructure and activities. During the last 15-20 years cities have spread to let progressively less area and population unaffected by urbanization, and we even have to question the relevance of our definitions of the city. After a period of stagnation, the growth of many big cities has once again accelerated in the 1980s, whereas the growth of middle-size and small cities are slowing down. Large urban areas are developing to encompass several urban centres, and the traditional distinctions between intra-urban and inter-urban relations are becoming less clear. At the same time spatial segregation is growing and changing in nature as development affects areas within the city regions in different ways, leading to (often new patterns of) intra-city differences between areas in levels of development. Not only are cities in different countries affected differently by economic transformation, but the transformations even impact differently from one city to another within the same country, and they do not necessarily affect the same types of urban area, or the same social groups.

The purpose of the document is to contribute to the discussion of what strategies of spatial organization are necessary and feasible to ensure a sustainable pattern of development of urban regions in Europe. In the discussion based on the document, one important set of questions will concern possibilities and ways of strengthening the role of urban regions as "economic engines" as well as arenas of production, consumption and welfare, based on the environmentally sound principles of development and functioning at all regional levels, as elaborated in the document.

In other words the document deals with two major and interconnected challenges facing regional and urban policy-making in Europe in the present decade, viz.

* *the challenge to determine and develop the future roles of urban regions in the general context of regional and national policies for socio-economic change, and,*

* *based on our best knowledge, the challenge to develop urban regions in accordance with the principles and requirements of established environmental goals and considerations.*

The point of departure is the internationally shared political concerns about the ability of urban regions to fill their most important societal tasks within the emerging spatial division of labour, including regional socio-economic performance and the meeting of requirements necessary to achieve a sustainable development.

Problems originate from urban decline leading to spatial dispersion of economic activity and population settlement, as well as from urban growth. Both phenomena are in different ways and to different degrees associated with processes of economic restructuring, de-industrialization, decentralization, changes in economic functioning, demographic development, regional integration and the transformation of urban hinterlands, and subsequent urban sprawl.

In other words: A policy for a sustainable pattern of development in urban areas in Europe of the 1990s will have to deal with a complexity of interconnected problems, occurring in different combinations and to varying degrees across European space. The problems are generated in and affect urban regions of a wide range of population and area sizes, functional and physical types, spatial patterns, and levels and phases of development.

Though explicitly recognizing the great variety and widespread significance of urban problems, and their composite nature and causality, this document focuses mainly on two priority aspects of urban and regional policy:

* *the guiding of options open to human action provided by limits on the natural capacity of the earths eco-system to harbour such activity,*

* *the policy options related to spatial organization of urban functions, i.e. in the development of locational patterns of built environment in urbanized areas.*

This does not mean that i.a. social, economic and fiscal problems with corresponding managerial aspects within the totality of urban policies, are considered less important. It simply reflects a wish to focus from an angle allegedly of utmost importance to environmental policy considerations in the face of accelerating urbanization and spread of urbanized areas and urban problems. This choice of angle implies that spatial organization of urbanized areas is taken to be a decisive factor in overall socio-economic and environmental development, and in the problems generated in these spheres. It therefore needs to be taken into account in government decisions at all levels, and in proper recognition of the scientifically agreed-upon requirements of a sustainable urban development.

The document gives a brief overview of significant historic patterns and emerging trends in regional development in Europe, and identifies important challenges to urban regions asserted to be posed by recent features of change in demographic, socio-economic, geo-political and political conditions. Emphasis is put on features considered fundamental to those aspects of physical development in (especially medium-sized) urban regions identified as explicitly relevant to their regional role and environmental status.

The main part of the document commences with an elaboration of the concept of 'sustainable development' specifically for operational employment in the context of the purpose at hand, and specifies the most important interconnections between features of regional structure and development in urban regions, and relevant operational aspects of "sustainability" as defined in the document. Next, the objectives of a sustainable development of urban regions are put in concrete terms, and the fundamental premises on which a sustainable development has to be founded are stated and briefly discussed in the light of recent research.

In a policy context the most important questions are those concerning implementation - how to carry political agreements on plausible strategies into effect. The document therefore exposes both objectives and premises to an assessment of feasibility. Feasibility concerns conflicts of interest, competing goals and necessary trade-offs. Feasibility even rests on the assumption of general agreement on superior goals and necessary means, a state that is not easily established even if the desirability of sustainable development is commonly shared:

The term 'sustainable development' shares many characteristics with 'democracy' and 'freedom'. All are recognized as good, as being a goal, and are often used as a means of mobilisation. However, when people seek to achieve these it is necessary to define the terms carefully and to identify means and operational goals. It is then that problematic characteristics become apparent." (Piers Blaikie 1991).

Hence, the last part of the document is a discussion of limits and barriers to achieving a sustainable development of urban regions in Europe, bearing in mind that urban areas face problems in their functions in relation to the opportunities and welfare of their residents, in relation to their role in economic development at different levels, as well as in their relations to local and global physical environment. The challenge to urban-regional development policy is no less than the necessity to deal successfully with all these problems simultaneously, in different combinations and within different contexts, acknowledging the absolute constraints on long-term sustainability placed by the limits of ecological carrying capacity.

2. *Patterns of urban structure and development in Europe in the framework of a balanced regional development*

The overall picture of urban development in post-war Europe is one of substantial growth in both area and population of cities, leading to rapid urban change, often in unpredictable ways. This development is part of the general spatial restructuring of economic and social activity in European countries. The diverse map of urban Europe and the complexity of present and emerging tendencies give no clear base for the prediction of future change. Nevertheless the development of cities in different European countries show many similarities, due to a number of common driving forces within the economic and technological development. Given the current trends, urban spatial expansion will hardly reach a "saturation level" within the not-too-distant future. There has been a shift from "first generation" urban environmental problems, characterized by local damages due to concentrated emissions from production activity, to "second generation" problems originating from consumption rather than from production, from diffuse sources rather than from concentrated ones, and with global effects in addition to the local consequences.

2.1 Patterns and perspectives of urbanisation and urban structure

The challenges to urban and regional policy in Europe towards the turn of the century have to be assessed against the actual background and problems of regional development, in order to enable an adjustment of policies to the urge presented by the requirements of a sustainable development.

Since 1945 (in several countries even much earlier) the dominant population trend everywhere in Europe has been from the countryside to the cities. By 1970 around 70 per cent or more of the population was officially classified as "urban" in most countries, although allowing for considerable uncertainty due to variations in the units and methods of classification. By 1985 Northern Europe had reached an urban share of 86 per cent of the population, and Western Europe was up to almost 80 per cent. Southern and Eastern Europe were "lagging behind", with just above 60 per cent classified as urban in 1985, i.e. even a little behind the former Soviet Union.

The point of departure therefore, is that most Europeans live their lives in towns and cities or in their immediate vicinities, i.e. in urban environments. In the EC alone there are 800 cities of more than 50.000 inhabitants, and altogether more than 80 percent of the EC population lives in urban areas, whilst 80 percent of the land is classified as rural. Some of the Community's most severe and acute problems are found in larger towns and urban areas (Cheshire et.al. 1987, Commission of the European Community 1992).

Also in the larger European perspective (including Central-Eastern Europe) the population density and degree of urbanization are high. Even though the Nordic countries stand out as extremely sparsely populated, the great majority of their inhabitants live in urban settlements of different sizes. Only a very small fraction reside outside daily travelling distance - mostly commuting distance - from at least a medium-sized urban settlement (Foss et. al. 1992).

According to UN medium variant projections the share of the population living in urban areas is expected to have risen to around 70 per cent in Eastern and Southern Europe, and in the states of the former Soviet Union, by the year 2005, and to about 83 and 90 per cent in Western and Northern Europe respectively.

This unified, although not quite comparable, macro-demographic trends conceal that especially in the 1970s and 1980s Europe experienced a very complex pattern of population redistribution, revealing sharp contrasts between the different countries and regions of the continent. This should be stirring considerable unease as to the descriptive relevance of the coarse urban-nonurban projection criterion. As indicated by Champion and Illeris (1990), a more mosaic mixture of dynamic growth and crisis-ridden regions might well be developing partly at odds with the traditional dimension of centre and periphery.

Regional-demographic change (i.a. urbanization and the development of urban regions) is of course the outcome of a complex interplay of demographic, economic, social and technological forces, and it should be emphasized that the physical and social shaping of cities and urban areas mirrors the impact of this interplay rather than the influence of any single factor. For instance may expansion of the urban area, or urban sprawl, in most cases be strongly attributed to factors like changes in material welfare and shifts in transport technology, and may take place under quite different demographic circumstances.

Some of the main features of the pattern of regional population distribution in the period may be described roughly like this:

1. In some countries starting as early as the late 1960s, and generally reaching predominance during the 1970s, the national capitals and other metropolitan areas in nearly all of Europe experienced a drop in population growth rates down to below national averages. During the 1980s, however, far more varied tendencies emerged. Above-average growth rates were resumed in many capitals and major city regions (that was the case in Finland, Iceland, the Netherlands, Norway, Sweden and United Kingdom), while around and below average growth was maintained in several major metropolitan areas (Belgium, Denmark, France, the Federal Republic of Germany and Switzerland).

2. The agricultural/rural peripheries conversely experienced a swing from below national average growth rates to on or above average growth, especially during the 1970s. In the 1980s the peripheries of several countries fell back to population decrease or at least to below average growth rates, while in the peripheries of other parts of Europe growth rates remained above average. Decrease or below average growth was the case in Finland, Iceland, the Netherlands, Norway and Sweden. In Belgium etc. the growth rates remained above average.

3. In countries where it is possible to distinguish a category of old industrial and mining regions, traditionally recorded with above average growth rates, these regions definitely entered an era of population stagnation or decline during the 1970s, never resuming their former state of growth.

4. The somewhat mixed intermediate regional category, normally containing a number of medium-sized towns, in most cases gradually improved their growth performance from the 1950s/1960s to the 1970s, attaining on or above national average rates. During the 1980s this category split in two groups; one group continuously growing at average pace or faster, while the other dropped to below average growth. In some countries - notably France, the FRG and UK - the southern, least central representatives of this category behaved quite differently from their northern counterparts, recording the highest growth rates of all regions throughout the 1970s and 1980s.

The timing as well as the pattern of population redistribution and urbanization are shown to differ substantially between the countries of Europe, calling attention to important diversities in natural conditions, history, economic and political structure, and processes of change. In spite of the good reasons for observing these important differences, some major trends indicate, however, certain typical features of urbanization and urban development common to most industrialized countries, indicating that the urbanization process and the development of the relations between urban cores and their hinterlands may be seen as a sequence of phases. To some extent present differences in characteristics between urban regions in Europe may be "explained" by variation in sequential level of development (Kunzmann and Wegener 1991).

One important stage is characterized by the spatial expansion of urban housing and labour markets as industrialization of agriculture and improved transport systems, transform the wider rural hinterlands of towns and cities into integrated urban surroundings, and thereby increase transport work and expand urban built environment into rural land. The boundaries between towns and cities and their hinterlands are becoming increasingly vague, and dispersed urban development is further stimulated.

This stage is also frequently associated with deconcentration of population and settlement, and with urban de-industrialization, causing industrial change and a growth in production activities, population and urban functions in urban surroundings and satellites; in its turn imposing increased pressure on rural land and recreational areas. This kind of process in different countries occured to varying degrees at all city levels, forming large metropolitan conurbations as well as hampering inter-regional migration and causing lower-level regional integration and stability, as the bottom tiers of the center system was completed and compensated peripheral jobloss trough in-commuting possibilities.

The counterpart of these processes is inner city decline, socio-demographic change and industrial restructuring in the urban cores. The new transport structure and population geography of urban regions is one of the driving forces behind the characteristic restructuring of the retail sector during especially the last decade.

Industrial change and the urbanization of the countryside is linked to general processes of change in regional divisions of labour and in functional specialization. The emerging new spatial patterns of regional interdependence and interaction are associated with increasing transport needs and growing regional differences in economic basis, income and employment. The processes of spatial restructuring affects whole urban regions as well as the relationship between cities and their hinterlands, and the spatial organization of human activities within urban regions.

Theories of the "life-cycle" and growth waves of urban regions suggest that urbanization starts in the building of an urban core or "inner city", and logically continues as a "spill-over" to progressively wider circles of urban commuting areas as the inner areas are filled up; eventually a decline in the population within the inner circles will commence as more distant small and medium-sized towns are integrated in the metropolitan area. Eventually growth picks up in the core and within the inner circles, heralding a period of reurbanization. In the ideal-typical case the urban region is passing through four stages: initial urbanization, suburbanization, desurbanization (with increasing growth in smaller towns and urban settlements) and reurbanization (that may or may not contribute to the development of continuous metropolitan areas and the gradual disappearance of intrametropolitan rural features). (Kunzmann and Wegener 1991).

Cautious generalization from information on differential urbanization processes in Europe suggests that at least some variation in pattern and timing of urban development may be interpreted with reference to the "life-cycle theory", i.e. to non-parallel shifts between the stages of the life-cycle (The Commission of the European Communities 1991). Development in the 1980s may indicate that i.a. United Kingdom and the Federal Republic of Germany are examples of mature, urbanized industrial countries, having led the movement through the cycle and entered the stage of reurbanization; closely followed by countries like France, Italy and the Benelux (The Swedish Commission on metropolitan problems 1990). The late 1980s saw indications of a commencement of a general process of reurbanization. Some analysts nevertheless consider counterurbanization as an ongoing process (Breheny 1992a).

In Central Europe the urbanization phase, with growth occuring predominantly in the core, is the pre-war situation. The reconstruction after the war more or less replicated this pattern. In Southern and Eastern Europe urbanization still continues. Counter- and de-urbanization tendencies can be found primarily in the highly urbanized countries in North-West and Central Europe, while in the Mediterranean basin the urbanization phase is still sustained by higher birth rates and high rural-to-urban migration. In suburbanization the suburbs grow

faster than the core because residential development in the core declines for lack of space, while jobs remains in the center - though shifting in industrial mix and content, and only gradually diffusing to the residential areas. In the de-urbanization phase development shifts even to the urban periphery and beyond to small and medium-sized towns at the less urbanized fringe. Among the consequences of these processes are longer and more time-consuming work and shopping trips, higher energy use, pollution and accidents, excessive land consumption and problems of public transport provision in low density areas. The counterpart is inner city decline and growing social segregation. Re-urbanization has been a marked trend in some cities across Europe since the mid-1980s, partly reversing several decades of suburbanization or absolute population decline. This is especially found in countries like Germany, France, the Netherlands and Great Britain.

Even Central and Eastern European urbanization may largely be characterized by its similarities to the "model", and to West-European urbanization. These similarities express some general rules of modern urbanization and historic continuity of European urban development. Post-war industrialisation in Central and Eastern Europe created the inevitable spatial consequences of rural-urban migration, urban concentration of population, spatial separation of workplace and residence, suburbanization, intra-regional functional specialization etc. There are, however, Central and Eastern European particularities as well, due to factors like belated urbanization and the state socialist system. One of these particularities is that the rural population and the potential of urbanization is still great and of considerable economic importance. Another is that the fast pace of the late starter left infrastructure behind. A third is that urban society was only to a little extent marked by middle-class patterns of consumption, residence and behaviour, a factor that greatly influenced the development of western cities (types of housing and residential location, types of services, car-ownership etc.) (Enyedi 1992).

The overall picture of urban development in post-war Europe is thus one of substantial changes in both area and population of cities. Within the EC the dominant trends are suburbanization in the north and continued urbanization in the south. Recent trends suggest that the fastest growth is taking place in smaller cities and towns throughout Europe although at a declining pace, and in some medium-sized cities in the more prosperous areas. While most of the major cities in the north by the beginning of the 1980s had completed their cycle of growth and decline, southern cities continued to grow - although at a declining rate - during the 1980s. At the same time suburbanization continued at almost the same pace, and some smaller cities started to grow more rapidly. In the south the combination of rapid growth and lack of planning led to "spontaneous" urban sprawl, often without adequate infrastructure. Urban sprawl is even typical in the north, but may to a greater extent be attributed to conscious planning (The Commission of the European Communities 1991).

The development of cities in terms of size of area and population, and types of functions, is largely a result of industrial and socio-economic developments. Present developments include the economic and industrial transition caused by global economic change in markets and technology, and notably the European economic integration, the development of telecommunication and high-speed transport networks. These developments may well lead to increased competition between cities for investments and societal functions, thus forcing more political attention to be directed to enhancing economic attractiveness and growth. Gaspar (1992) maintains that internationalization has created greater competition between different localities for investment and development, and that the spatial competition in the new Europe is increasingly becoming competition within the European urban system, rather

than competition between regions. The new forms of reconcentration, based on the changes in the production system, are alleged to favour selected cities, depending on their competitiveness.

Problems of urban decline (and associated dispersal of people and economic activity) as well as problems of urban growth (and associated pressure for urban expansion) are related to regional development and have the character of regional problems (although on a different scale). Urban decline in Europe is related to the traditional industrial regions of early industrialization. The period of growth of the affected cities was historically associated with the process of industrialization, and conversely their decline is now forced by their problems of adjusting to the period of industrial decline and transformation of the economy. This process of industrial and spatial restructuring is tending to spread out from urban cores to hinterlands and the more comprehensive region, and there is a tendency for association of urban decline and the domination of local economy by large scale, "fordist" industry (Cheshire et. al. 1987).

Problems of urban growth have a tendency (although important variations are observed) to be the regional manifestation of agricultural restructuring and impoverished rural regions. Urban growth is also, however, a landmark of recent industrialization, mirroring that restructuring of industry on a world-wide scale allows for late industrialization of traditionally non-industrial or low-industrial regions. Despite the wide range of different patterns of urban development and problems that is observed, most analysts agree that a clear link exists between problems of urban growth and decline, regional problems and industrial decline/industrial restructuring. Accordingly urban development policy at a certain level has to be made a conscious aspect of industrial and regional policy, taking account of the differential roles and phases of different urban regions in the wider process of spatial economic and industrial restructuring.

There is, however, considerable debate over the future pattern of urban development in Europe. Several simultaneous and interdependent processes seems to pull in different directions and the existing urban landscape is marked by considerable individuality reflecting i.a. the time periods of peak urbanization, cultural differences, and varying historical and spatial context.

Emphasis is especially put on two underlying processes:

1) Economic restructuring; from a traditional industrial economy with its specific institutional superstructure (the Keynesian welfare-state, a centralized nation-state), and spatial organization (characterized by a center-periphery model, and functionally organized and segmented urban space), to a "post-industrial" or "information economy" with its corresponding institutional changes (political decentralization, deregulation of markets, reduced nation-state influence), de-industrialization and increasing predominance of different service industries and occupations based on advanced information and communication technology, and new tendencies of spatial organization less dependent on markets and local resources. The shift is often described as a transition from a "fordist" to a "post-fordist" economy, to mark the break with the period of rapid growth of standardized mass production and consumption, massive urbanization and the organization of urban areas in separate homogeneous spaces according to function (production, services, housing). The emerging economic counterpart is asserted to be transient and flexible in time and space, and based on a new locational logic and spatial division of labour (Foldager 1993).

2) Economic integration; notably the creation of the Single European Market (SEM) and the closer integration of ever new countries into the SEM is asserted to intensify economic competition between cities and regions and create a new regional division of labour throughout Europe, based on changing locational principles.

The most cited vision of the future distribution of production and population in Europe, based on these tendencies, predicts a concentration around the largest and most centrally located urbanized regions in Europe, within a "banana" stretching from south-east England in a bow trough Brussels, Stuttgart and Zürich, towards Milan and Genoa. This vision is the alleged outcome of classical economic analysis as well as some modern regional economics. A second model prescribes a locational tendency towards low-cost (low-wage) regions as capital and labour mobility increases, while labour is moving towards regions where wages are higher, thus tending towards (spatial) equilibrium.

Both visions are criticized for being too simplistic and for lack of realism. Kunzmann and Wegener (1991) has introduced the "European grape" as a metaphor of the shape of future urban Europe in a far more "cooperative" atmosphere than the "blue banana" which is the pure expression of competition between regions. The "European Grape" is exhibiting a polycentric urban system covering most of Europe. The most systematic critic, however, is Sven Illeris (Illeris 1991). Illeris suggests a mosaic urban picture, which is not really a development model, but a realistic acknowledgement of the profound complexity of forces and trends shaping regional development in Europe. This complexity avoids any simplification in terms of concepts of 'concentration' or 'dispersion'. Illeris sums up his study of forces and trends in regional development in Western Europe by drawing a "confusing" mosaic picture of urban and regional development, which he also predicts to represent the most probable future scenario. He also identifies contradictory forces in the so-called "post-fordist" development, allegedly reinforcing his argument. His approach may also be interpreted as scepticism to the argument that the shape of future Urban Europe is automatically determined by economic forces, and a recognition of considerable local political influence, "disturbing" the general pattern, i.a. through policies of spatial organization.

In any case available knowledge leaves considerable uncertainty regarding the outcome of forces and trends in urban development in Europe. The major forces are identified and discussed by Hall (1993) and Castells (1993), some of which are briefly to be mentioned:

1. *Technological revolution*
2. *Globalisation and the formation of continental trading blocks*
3. *The transformation of eastern Europe*
4. *The shift to the informational economy*
5. *The impact of transport technology*
6. *The impact of information technology*
7. *The new role of urban promotion and boosterism*
8. *The impact of demographic and social change*
9. *European integration*
10. *European identity and immigration*
11. *Social movements*
12. *The new marginality*

Castells sees the future prospects of cities and regions as largely determined by their ability to combine three key factors: Informational capacity, quality of life, and connectivity to the network of major metropolitan centres at the national and international level. The spatial logic is characterized by the pre-eminence of the "space of flows" over the "space of places". This logic, and the forces shaping it, are asserted to have a structural tendency to generate a polarized occupational structure, disfavouring immigrant workers and the growing segment of the older native population in an emerging "dual" structure. Peter Hall sums up his discussion of urban trends by suggesting a New Urban Hierarchy with important internal differences in development perspectives and (most likely) trends; the hierarchy consisting of Global cities, City regions in global fringe or corridor zones, Remote regional cities, National and regional capital cities, County towns and Specialised service centres.

The diverse urban map of Europe and the complexity of present and emerging tendencies give no clear base for the prediction of future change. The overall picture is not likely to change dramatically, but considerable changes may occur within cities and urban regions as functions respond to socio-economic pressure, and new functions require appropriate space within the area. Special attention has to be called to the wide-spread and consequential tendencies of urban sprawl. Urban sprawl is not only recognized as a typical pattern of development in a large number of European regions, but is also held to be a main factor impacting the activities of daily life of households and the development of traffic loads and land use detrimental to environment.

We should also take notice of the considerable differences that exist between European countries and regions in population densities and pattern of population settlement, as well as in industrial structure and employment. At the regional level population densities vary from between 2 and 25 inhabitants per. square kilometer in most of the Nordic regions and in parts of Portugal and Spain, to between 200 and 14000 in regions over a large part of countries like United Kingdom, the Netherlands, Belgium, Germany and Italy. Considerable shares of the national populations of these latter countries are concentrated in very large and densely populated metropolitan regions. The participation of women in the labour force also varies considerably, from around 40 percent in Ireland, Greece and Luxembourg, to 70-80 percent in the Nordic countries. Employment in services is 70-90 percent in one group of regions, and down to 30-50 percent in others. In considerable parts of continental Europe service-employment amounts to 50-60 percent, and many regions still have an industrial share of employment of 30-55 percent (NordREFO 1993). The starting point and course of economic restructuring, population movement and urban development and transformation must therefore be expected to differ substantially between European countries and regions.

Generally policy-making should give considerable attention to the great variety in degrees and types of urbanization and the subsequent differences in urban-regional spatial structure. It will be necessary to roughly identify significant functional types of towns and cities at different urban/regional levels, and with different spatial trends according to their present phase in the urbanization process (urbanization, suburbanization, desurbanization, reurbanization). Especially attention should be drawn to emerging patterns of spatial polarization and functional specialization between cities and regions in the wake of a growing division of labour in the European economy, forced and enabled by internationalization and integration of the economy, the emerging high-speed transport infrastructure, and the transformation of economies through technological shifts in production, distribution and communication systems, tending to create a new urban hierarchy through intensified competition.

The purpose would be to enable a differential assessment of urban-regional development in relation to the development of the wider economic and demographic system. For instance it would be wise to observe the different stages, patterns and potential of urban development in different parts of Europe, as indicated above. Roughly we may point to the division between the Northern and Southern Region, and the special situation of the countries of the Central and Eastern region.

2.2 Stages of urbanisation and problems in spatial development

It is a fact that most of the population of Europe lives in urban environment. It is also a fact, however, that the notion of "urban" has become increasingly ambiguous, arousing associations of surroundings ranging from the typical environment of urban cores to a variety of different mixtures of rural and urban surroundings. Urbanization has more and more come to imply the penetration of the rural by the urban, the spread of urban surroundings and ways of life into rural community. As a consequence the boundaries between towns and cities and their hinterlands have become increasingly vague, and in large parts of Europe one may rightly ask whether areas spared by urbanization still exists.

The built environment is a fundamental means by which individuals and societies orientate themselves in time and space, and make the basic as well as day-to-day decisions that determine important features of the structure and dynamics of everyday life and social organization within the regions. Thus the evolution of urban environments has enormous impacts on patterns of production, consumption and everyday activities in society (and, of course, vice versa).

The different patterns of urban development and types of spatial organization of urban functions correspond roughly to different levels or stages in the sequence of general urbanization process, reflecting to a certain degree the level of economic and industrial development in the country or region. Within Europe urban areas associated with quite different phases of urbanization exist side by side, and these areas are presently exposed to many of the same general socio-economic forces and trends that are influencing urban development all over Europe, while some social and economic change is reflecting the specificities of the region and country . They represent, therefore, quite diverse arenas and challenges of urban policy, and different points of departure for development strategies; both from an environmental and a welfare point of view.

But even when dealing with similar types of regions it is important to note that spatial organization of urban functions within the region means different things to different social groups, as its impacts on the activities of everyday life and their welfare-producing potential are depending on social characteristics and activities like age, family and household characteristics, general socio-economic position and i.a. labour-market status. Both resources, the requirements of the life-situation and the corresponding functional dependency on spatially organized institutions and possibilities vary according to socio-demographic characteristics, life-cycle phase and other aspects of individual lives. The different social position, responsibilities and employment status of men and women are particularly noteworthy in this context, as men and women are shown to exhibit quite different dependencies and make quite different use of urban space, especially during certain phases of the life- and family cycle.

The relationships between spatial structures and socio-economic activities are complex, however, the organization of a city or urban region being largely the outcome of how individuals, firms and authorities interact so that everyday problems can be managed. Given an agreement that there is a connection between the prospects for sustainability and urban spatial order, there are also related issues concerning trade-offs that will have to be made as environmental objectives potentially are at odds with social and economic aspirations. The established spatial order or urban form will affect how easily the patterns of daily life can be altered to improve the environment, and the potential for adjustments of spatial structures in order to promote environmental as well as quality of life benefits.

Urban development in the postwar period has to a high extent been characterized by a strong spatial expansion of the urban area. In particular certain parts of europe during the 1970s and 1980s saw a pronounced pattern of deconcentration and increasing suburbanization of population and jobs, indicating the spatial extension of the functional urban region as well as an increasing functional specialization of its elements.

This development has been rendered possible by a significant growth in private car ownership. As mobility increased, areas previously considered as too remote for new residential or commercial development, now became more attractive building sites. In addition, increased car traffic demanded more urban roads, which themselves were space-requiring and thus contributed to an accelerated conversion of land. Furthermore, higher mobility and rising income levels have produced conditions for a change in the demands on the housing market towards a higher share of low-density residences, with a particular increase in the construction of detached one-family houses.

The trend described above has been characteristic for the development of cities in most parts of the world. Data from a global sample of 32 large cities, for instance, show that while the average population growth between 1960 and 1980 was 28 per cent, the average spatial expansion was 65%. Thus, the urban area per capita increased by 29 per cent on average in this period of twenty years. The growth in urban area per capita was a bit higher in the 12 European cities included in the sample. While these cities had a zero population growth on average, the average spatial expansion was 34 per cent (Newman and Kenworthy 1989).

Between 1960 and 1980, the population in 24 Norwegian towns grew by 153 per cent in average, while the spatial expansion in the same period was 25 per cent. The urban area per capita thus rose from 244 square meters in 1960 to 492 square meters in 1980, or about a doubling.

Reduced economic growth in most of the 1980s and so far in the 1990s may have led to a more moderate urban expansion after 1980. In Sweden, the average population density in urban areas almost stood still between 1980 and 1990, as compared to a 13 per cent decrease between 1970 and 1980. A similar stagnation seems to have occurred in Norway, where the average urban area per capita in the above-mentioned 24 towns changed from 492 to 500 square meters between 1980 and 1990, or only by 2 per cent (Larsen and Saglie, 1994).

The small changes of the population density figures between 1980 and 1990 probably reflect an increased emphasis on urban renewal and infill projects during the later years. However, the low expansion of the towns ' area use per capita may also mirror that the most area-expansive development has often taken place in areas separate from any existing town. For example, in several Norwegian municipalities, a significant part of new residential areas

between 1980 and 1990 - particularly those dominated by single family homes - were established as "satelites" in rural areas, and were accordingly not included in the 1990 demarcation of the original towns. Thus, the seemingly low spatial urban expansion in the eighties may in part be a result of a land use where the most area-demanding development took place as a formation of new urban communities, while the original towns (which were the objects for comparisons across the decennies) were to a higher extent characterized by infill development and urban renewal.

The prospects for future development indicate that the urban spatial expansion hardly will reach a "saturation level" within the not-too-distant future. Breheny (1992a) describes the process of counter-urbanization as a strong and still dominant trend. In most European countries, long-term economic forecasts imply a significant rise in the private consumption level. Changes in the household structure (e.g. a higher proportion of unmarried and divorced adults, widows and widowers, and increased inclination among young adults to establish separate households) contribute to a demand for more dwellings per 1000 inhabitants. Furthermore, when a quantitative saturation (measured in number of dwellings) has been achieved, an increasing share of residential building will probably take place in order to provide standard improvement for those who already have their own dwelling. With increasing affluence, for example, residences are equipped with more rooms as families acquire PCs, additional television equipment etc, giving each family member more choices and resulting in needs for a higher number of square metres per dwelling. In combination, these trends are likely to make up a significant need for residential areas. According to Breheny (1992a) more than 1.1 million new houses are required in South East England between 1991 and 2011. A Norwegian survey in 1992 shows that the trend towards smaller households has not led to higher densities in planned housing areas. 70 per cent of Norwegian municipalities were planning an average density of less than 10 dwellings per hectare in new residential areas, while only 2 per cent of the municipalities were planning with average densities above 20 dwellings per hectare (Saglie 1993).

The development of cities in different European countries show many similarities, due to a range of common driving forces within the economical and technological development. As for the latter, the emerging railway technology at the end of the 19th century was a supposition for the subsequent development of suburbs along railway and tramcar lines, contributing to give the cities a linear or star-shaped geometric form. In the age of mass automobilism, the incitement to build in proximity to the public transportation lines was weakened. The new dominant transport technology reduced the need to be located near the city centre, thus opening large areas as potential sites for urban development. As a result, many cities have grown to amoebiform carpets sprawling out into the previous countryside.

The technological development is closely tied to the economic development and its driving forces. Economic growth and accumulation has been a prime objective both for public authorities and the dominant economic agents. The development of mass automobilism and suburban, detached housing represented an immense expansion of the sales markets for automobile factories, oil companies, road entrepreneurs, the building trade and for landowners. The car-based and low-density urban development was therefore perceived as economically beneficial for broad sectors in society.

Although many planners have foreseen that functional and environmental problems might occur from such an urban development, it has turned out to be difficult for planning authorities to steer the course in another direction. The sociohistorical context of urban development in Western countries is a situation where individual firms and households in

urban space exert substantial individual control over the purchase, sale and development of land, nevertheless none has control over the aggregate outcomes that emerge from the process. This invokes public planning and control, but at the same time market institutions impede and resist the progressive emergence of collective action. In practice, this means that urban planning tends to be restricted to an after-the-fact search for "feasible" remedies to the negative outcomes of the contradictory process of urban land development (Scott and Roweis 1977).

In the former Eastern European countries the situation has been somewhat different. But in these countries too, environmental concerns have been largely neglected, not so much because public authorities were lacking the formal power to control the urban development, but rather due to a one-sided emphasis on quantitative production objectives (Johnston 1989).

Above we have pointed to some driving forces that can help to explain important common traits in many European cities. Together with these similarities, we also find great differences due to inter alia cultural, economical, political and topographical variations, and because different cities may contemporaneously be at different stages in their development. For example, among the 12 European cities included in Newman and Kenworthy 's (1989) study, the population density varied between 30 and 72 inhabitants per hectare, and the energy use per capita varied between 9 000 and nearly 17 000 megajoule.

Alongside the challenges treated above the future of European urban regions depends largely on their ability to anticipate and accommodate the changes that are inherent in the transition to a service and knowledge-intensive society and the increasing economic competition following economic integration and restructuring of the global economy. Important changes that may be expected are (i.a. van den Berg 1991, Hall 1993, Kunzmann and Wegener 1991):

** A growing importance of the quality of living and locational environment for attracting investment, the better educated labour force, and generating economic growth; environment as well as level of living becoming competitive assets.*

** The rapidly intensifying spatial interaction among European cities and city-regions with respect to goods as well as business, leisure and social traffic, and possible polarization through high speed transport infrastructure.*

** The increasing economic competition and specialization (division of labour) among European towns and cities, and the possibility of new hierarchies of cities and shifting patterns of dominance and centre-periphery relations.*

Obviously, these features render European cities with both actual and potentially unequal opportunities in their environmental as well as in their socii-economic "project", the one increasingly depending on the other. This may call for political attention to equalization as a necessary condition of a sustainable urban development policy.

2.3 Problems in urban regions and their causes

This chapter takes off from the field established in chapter 2.1 and 2.2, identifying the major problems in urban development in relation to welfare and sustainability, and, as far as possible, indicating the most important links between types and profiles of problems and relevant background trends and forces characteristic to different types of urban regions and urban-regional development.

The specific purpose is to draw attention to how the specified background processes affect (1) the functional/economic and (2) environmental performance, of different types of urban regions, especially through the development of their spatial pattern of settlement and built environment, i.e. the relations between town/city and the entire urban region.

Problems related to particular types of spatial organization and functional structure of settlement and economic activity, and of spatial patterns of built environment and related transport activity, may be i.a. impacts on nature from (1) excessive consumption of land, (2) disturbance of ecological systems by air, soil and water pollution, and (3) high energy use; and impacts on the quality of life due to (4) accidents, (5) noise and (6) excessive use of time for commuting and other necessary activities of every-day life by the inhabitants.

In recent years substantial knowledge on several of these relations are established through selected major research projects, and suggestions are worked out as to their modification in order to fulfil the criteria of sustainability in urban development (i.a Newman & Mouritz 1991, Næss 1993b). There is far less knowledge, however, on the relationship between urban-regional spatial structure and economic performance and welfare, and between socii-economic and environmental development in different types of urban-regional settings, and the need for more research on these topics is obvious.

The urban development in European cities throughout the last 40 - 50 years has led to a range of serious environmental problems. The kinds of environmental problems emerging from the post-World War II urban development, are to a high extent different from the ones previously experienced.

Before the mid of this century, the dominant kinds of environmental problem in urban areas were local environmental damages due to concentrated emissions from production activity. These problems were dealt with partly by attempts to separate polluting industry from residential areas through land zoning, and gradually by a number of efforts directed to the source of the problem, ranging from the construction of taller chimneys to the instalment of cleaning outfit. This category of problems, however, was not tied to inherent properties of the physical structure of urban areas. The solution to an industrial pollution problem (pollution control technology, altered production process etc.) is in principle the same whether the enterprise is located in an urban or a rural area. Thus, neither the activity nor the problem solution is urban-specific.

As opposed to this, many of today's most serious environmental problems are directly rooted in recent tendencies within urban development. Along with the spatial expansion of cities and the increase in car ownership, there has been a strong increase in energy use for transportation. The transition from public to individually based urban transportation systems has resulted in increased traffic volumes and hence in higher energy use, emissions and noise. The spatial expansion has implicated longer travelling distances and thereby contributed to an additional increase in energy use and emissions. Another consequence of

urban sprawl is the conversion of agricultural land and loss of natural areas. All these types of environmental problems may be characterized as urban-specific.

A development may be outlined where the central point is moved along three axes:

** From environmental problems caused by production to environmental problems tied to consumption.*

** From emissions concentrated to a few, larger sources, to emissions from many scattered and diffuse sources (for example traffic).*

** From a perception of environmental damages as a local problem to an increasing awareness around international and global effects (i.e. acid rain and accumulation of greenhouse gases in the atmosphere).*

These new, "second generation" environmental problems are, to a significantly greater extent, tied to the urban-specific problems than are the "first generation" of environmental problems.

In most Western European countries, the "second generation" environmental problems are larger than the "first generation" problems, partly as a result of efforts to make the industry cleaner, and partly due to deindustrialization. In Eastern Europe, the "first generation" problems may still be dominating. However, as the transition to market economy in these countries proceeds, a shift towards the "second generation" environmental problems is likely to occur. For example, a large latent demand for private cars and more spacious dwellings exists in many cities of the former socialist countries (Grava 1993).

Among 12 European cities, the gasoline use per capita increased by 143 per cent on average between 1960 and 1980. The per capita energy use levels for transportation in European cities were still lower than in American and Australian cities, but the consumption levels were increasing by far most rapidly in the European cities (Newman 1992).

In the United Kingdom, transport accounts for nearly one third (31%) of all energy use, as compared to 23 per cent in 1979. The energy use for road transportation increased by 37 per cent between 1979 and 1988. The picture is not one of an environmentally concerned transport system, but one in which almost all the trends are in the wrong direction: Emissions of carbon monoxides increased by 20 per cent between 1979 and 1988, black smoke with 57 per cent, volatile organic compounds by 17 per cent, nitrogen oxides by 25 per cent, and carbon dioxides by 33 per cent. The only pollutant developing in a positive way in the period was lead, with a reduction of 58 per cent. (Banister 1992).

In Norway, the number of public transport passengers decreased by 8 per cent between 1982 and 1989. 10 per cent of the urban population live in areas where the level of noise is so high as to affect their health (disturbs sleep and causes stress). In Oslo, 22 per cent of the population live or work in areas with pollution from nitrogen oxides above recommended limits, and 29 per cent are exposed to soot pollution above recommended limits (Ministry of the Environment, 1988).

A survey of land consumption for urban development in 15 European countries shows an average conversion of approximately 8 - 10 square metres per capita and year, ranging from about 5 m2 in Switzerland to about 25 m2 in Italy (Bundesamt für Raumplanung, Bern, quoted from Schindegger 1990). Although these data may have rather high error margins, they illustrate a trend where urban population densities are rapidly declining.

In addition to the environmental challenges, and interdependent on their development and solution, cities and urban regions are facing a series of challenges concerning their economic performance and role in the emerging national and regional economy , their financial situation in relation to increasingly pressing development and welfare functions, and in their management of general functional and welfare problems in the course of socio-economic development and trends. Many of these trends and their implications are treated in the previous chapters. They are related to:

1) Population (decline of birthrates, ageing of population). Population development may create an unbalanced demand for public infrastructure, a high demand for health and social services and incertain regions contribute to urban decline.

2) Migration (continuing rural-to-urban migration in peripheral countries and growing international migration, especially South-North and East-West). Some urban regions will experience growing housing, employment and welfare problems, with possibility of incrasing segregation and tendencies of deveopment of "new urban poverty".

3) Socio-demographic process (increasing divorce-rates, decreasing household size, higher labour force participation of women, new life-styles). There will be a need for new services, housing land and transport policies. Emerging mobility and locational patterns requires attention to the preservation and recreation of social networks and neighbourhood relations.

4) Economy (restructuring of production and distribution, deregulation and privatization, internationalization). Increased competition between cities will and change to an innovation-oriented and competitive local economic policy may represent a serious challenge to social cohesion and equity. Increasing inter- and intraregional disparities may create social tensions and lead to reduced public services.

5) Transport/communication (Technological change stimulating personal mobility, increasing dominance of road transport, telecommunication and growth of high-speed public transport). There is a danger that dispersed urban development is further stimulated, and efficient public transport in small and medium-sized cities may become difficult. Polarization between European and national core and periphery, between areas within urban regions, and between social groups, may be a possible outcome.

European cities and urban regions are facing challenges on three different but interdependant fronts: An economic transition, a demographic transition and a social transition. The latter transition is dramatically reinforced by the growing and increasingly more persistent unemployment and economic exclusion in a period when European nations liberalize and deregulate markets in order to achieve more competitive economies. Under market conditions suburbanization as well as reurbanization will tend to increase existing social differences within urban regions and challenge the social cohesion necessary to achieve both economic, social and environmental ambitions. Therefore, the solution to the socio-economic challenges may prove a necessary condition to solve the aggravate environmental problems threatening European urbanized regions.

3. Sustainable urban development : objectives and conditions

The concept of sustainable development combines norms of justice and equity with an acknowledgement that nature 's ability to receive human-made encroachments and emissions is limited. The Brundtland commission points to the necessity of a substantial reduction in the energy use of industrial countries, in order to give room for technological development in the Third World, and at the same time avoid an irresponsibly high total global consumption of energy. This will have significant consequences for urban and regional development in industrial countries. A sustainable urban and regional development must secure :

* *A reduction of the city 's and region 's per capita energy use and emissions*
* *A minimizing of the conversion of and encroachments on natural ecosystems*
* *A replacement of "open-ended" flows where natural resources are transformed into waste, with "closed circuits".*
* *A sound environment for the city 's and region 's inhabitants.*

The four criteria reflect two different focal points within urban environmental policy: The city as a part of the larger natural ecosystems, and nature and environmental qualities within the city. If a sustainable development is to be achieved, it seems necessary to avoid further urban sprawl. Based on available knowledge, a concentrated urban development seems to be more in line with the sustainability criteria than a sprawling developmental pattern. However, a strategy for more compact cities should be cautious as not to decimate important elements of urban nature. At the regional level, a decentralized pattern of residence seems ecologically favourable, provided that the urban area per capita in each individual town or village is moderate.

Increasing urban road and parking capacity has environmental side effects which often outweigh the positive consequences of congestion relief. Although free-flowing traffic can contribute to lower emissions for each individual vehicle, increasing the space for cars usually results in more traffic. From a sustainability point of view, increased road and parking capacity in cities and urban regions is therefore problematic.

3.1 The concept of sustainable development

The World Commission on Environment and Development (1987) has launched the concept of sustainable development as a superior principle for long-term choices of political strategies. It is a multi-faceted concept including several dimensions:

* *An ecological dimension, concerning the conflict between exploiting and protecting resources*

* *An economic dimension, aiming to facilitate that investments and consumption take place with the least possible resource input*

* *A political/organizing dimension, concerning the establishment of institutional frameworks and measures*

* *A welfare dimension, concerning the ethical obligation to meet the basic needs of all humans*

* *A technological dimension, concerning the relationship to science and technology.*

The concept of sustainable development combines norms of justice and equity with an acknowledgement that nature 's ability to receive human-made encroachments and emissions is limited: The development must both in the present and in the future secure that all humans can have their basic needs satisfied, and the development must be sustainable within the carrying capacity of the natural ecosystems. The concept of sustainability thus integrates certain descriptive and normative premises.

The descriptive premises include inter alia the following assumptions about the global environment:

* *The accumulation of carbondioxide and other so-called greenhouse gases in the atmosphere will probably lead to a gradual increase in the global average temperature of between 2 and 5 °C within the end of the next century unless strategies to counteract climatic changes are implemented. Such a development will be a serious threat to lowland isles and coastal areas, and significant negative effects may also occur for water supply, agriculture and fisheries.*

* *To-day, species are extincted in a speed that has never before been witnessed. Throughout the biological evolutionary history, the frequency of extinction has been less than one per year. Due to human encroachments on nature, the present frequency is maybe ten thousand times as high. Furthermore, important ecosystems are decimated rapidly.*

* *One quarter of the world 's population consumes three quarters of the world 's primary energy. This implies that the energy use per capita among the upper 25% is about 9 times as high as for the remaining 75% of the global population.*

* *The global population, today amounting to about 5.5 billions, will probably exceed 8 billions by the year 2020.*

The normative premises can be shown to have roots in the United Nations ' human rights, particularly the economic, social and cultural human rights. Together with the civilian and political human rights, these rights were included in the United Nations ' charter of 1945, the declaration of human rights of 1948 and in two international conventions on human rights in 1966. By all these occasions, it was underlined that the human rights are valid for all humans, without any discrimination as to race, sex, language, political or other opinion, national or social origin, birth or other circumstances.

The economic, social and cultural human rights are relevant to the level of welfare each human, from an ethical point of view, should be entitled to. By awarding these minimum standards to each human, they simultaneously have relevance for an equitable distribution of welfare. The economic, social and cultural human rights include inter alia the rights to work, equitable and good working conditions, social security and a satisfactory standard of living as to food, clothes and dwelling, as high as possible physical and psychical health, education, participation in cultural life, and the right to gain benefits from the progress of science.

The United Nations ' declarations on human rights do not explicitly address our responsibility to future generations. This latter concern, however, is essential in the Brundtland commission 's notion of sustainability. A sustainable development requires a just distribution of benefits not only between humans living today, but also between the present and future generations.

3.2 Some major challenges to European and other developed countries

An implication from the above is that the emissions of carbon dioxides and other greenhouse gases have to be significantly reduced. (The UN-appointed International panel on climatic change prescribes a 60 per cent global reduction of CO_2 emissions.) The needs for technological development in many Third World countries implies that the energy use in these countries is likely to increase in the future. In the light of an equitable global distribution, it seems reasonable that the industrial countries should reduce their CO2 emissions by more than the average global percentage.

Some of this reduction may be catered for through a shift from fossil fuels to renewable energy sources. However, it does not seem realistic to assume that all of the required reduction can be obtained this way. The Brundtland commission underlines that there is a need of both a transition to more environmentally sound sources of energy, and a development towards a "low-energy future". The commission points to the necessity of a substantial reduction in the consumption of energy in industrial countries, in order to give room for a technological development in the Third World, and at the same time avoid an irresponsibly high total global consumption of energy. In an illustrative calculus in the commission 's report, this is specified to be a 45 per cent reduction from 1980 to 2020 (The Brundtland commission 1987, p 171).

The Brundtland commission states that such a development could and should be achieved without sacrificing the economic growth, neither in developed nor developing countries. According to the commission, continued economic growth in the industrial countries is necessary for these countries to maintain their function as a "locomotive" in the world economy, and hence for the possibility of achieving a desirable growth also in the poor countries. The commission underlines that the economic growth must be given a qualitatively new content if the environmental concerns are to be secured, i.a. by a stronger emphasis on cost effectiveness and efficiency in the utilization of energy and other natural resources.

However, the commission 's assumptions on the possibilities of a sustainable economic growth have been subject to certain objections. Among the most prominent critics are the World Bank experts Herman Daly and Robert Goodland (Daly and Cobb 1989, Goodland 1991), and the Norwegian winner of the Nobel Prize reward, Trygve Haavelmo (Haavelmo and Hansen 1991). Their main message is that the scale of the global economy has now become so large that further economic growth in industrial countries will inevitably produce such amounts of waste and emissions that nature 's capacity as a recipient will be overloaded in a few decades. They base their argument on i.a. an analysis showing that about 25% of the Earth 's biological net production today is being utilized for human purposes, and as high a percentage as 40% if the oceans are excluded (Witousek et al, 1986). With a projected global population of 8 billions within 30 years, an overall increase in the economic activity seems impossible in the long run according to those critics.

Regardless of the possibility or impossibility of a "green growth", the Brundtland commission 's recommendations will have significant consequences for urban and regional development in industrial countries. The developmental patterns cannot be based on a further increasing energy use from transportation and buildings, and a continued, excessive conversion of natural ecosystems into built-up areas.

3.3 What does sustainability mean to urban and regional developmental patterns ?

It has been argued that sustainable urban development is a contradiction in terms, as urban areas by definition require the resources of a wider environment for their survival. Partly for this reason, a strong element of antiurbanism has been influential within environmentalist thought. However, given current development patterns throughout the world, the likelihood of a return to a decentralized pattern of quasi-self-sufficient small communities is remote, and it is highly questionable whether such a pattern would be sustainable at present and projected levels of population. In considering the question of sustainable urban development, therefore, we must not only think in terms of urban areas themselves, but in the sense of their wider impact on regional and global ecosystems (Owens 1992). Similarly, Nijkamp, Lasschuit and Soeteman (1992) define a regional sustainable development as having to fulfil two goals:

1) It should ensure for the regional population an acceptable level of welfare, which can be sustained in the future; and

2) It should not be in conflict with a sustainable development at a supraregional level.

These requirements imply that a sustainable urban and regional development must secure:

1) A reduction of the city 's and region 's per capita energy use and emissions, towards a level compatible with the ecological and distributional criteria for a sustainable development at supraregional and global level.

2) A minimizing of the conversion of and encroachments on natural ecosystems and biological resources within the urban region.

3) A replacement of "open-ended" flows where natural resources are transformed into waste, with "closed circuits" relying to a higher extent on local resources, and recycling wastes at as local a level as possible.

4) A sound environment for the city 's and region 's inhabitants, without pollution and noise damaging to the inhabitants ' health, and with sufficient green areas to give opportunities for the population to experience and get emotionally related to nature.

There may be some contradictions between these four criteria. For example, attempts to maximize the satisfaction of the criterion of closed and short ecological circuits, may lead to urban developmental patterns that are less energy-efficient. Thus, the criteria of local resource use and recycling at the local level should be interpreted as an objective of self-sufficiency within the limits set by criteria 1 and 2.

The four criteria reflect two different focal points within urban environmental policy: The city in nature, and nature within the city. Traditional policies on urban environmental issues have mainly addressed the latter aspects, from considerations on the importance of parks, greenfields and a non-polluted air to the inhabitants' quality of life. Much of the contemporary "urban ecological" movement also focuses mainly at nature within the city (Attwell 1991, Svane Jørgensen et al. 1987).

The recommendations of the Brundtland commission imply that the focus must be expanded to encompass also the city as a part of the larger natural ecosystems, and perhaps with the strongest emphasis on these latter city in nature aspects. The challenge to urban planners, of course, is to consider both the city in nature and the nature within the city goals at the same time, finding ways to facilitate an urban development promoting both the overall ecological sustainability and the local-level quality of life.

The urban environment encompasses both the physical and social environment. The physical urban environment may be considered from among others an ecological, an aestethical, a recreational, a welfare or a resource-economical point of view. The social environment can be analyzed according to e.g. the degree of social integration or segregation for the city as a whole, patterns of contact or isolation among the inhabitants at the neighbourhood level, and in relation to distributional ethical criteria. A high unemployment rate will obviously affect the social environment of a city. Furthermore, to some people the term "urban environment" may be associated with the city's conditions for industrial and economic innovation and development.

However, the term environmental policies is most often perceived as policies aiming at protecting the natural conditions for human and other biological life (e.g. soil, air, water, vegetation and ecosystems) against degradation. This scope is also mirrored by the typical fields of responsibility of the Ministries of the environment in different countries. Although the main focus most often is at the natural environment, environmental policies often also include certain aspects of the man-made, physical environment (e.g. protection of cultural monuments, recreational parks and pastoral cultivated areas).

The term sustainable development is, as outlined above, a more specific concept than the general term of environment protection. At the same time, it encompasses some aspects not included in the latter concept. Basically, sustainable development comprises those aspects of environmental protection that are fundamental for the long-term uphold of conditions for human prosperity and well-being. Equity between generations is a main issue. At the same time, sustainable development has a strong element of intra-generational distributive ethics, focusing at how the material standard of the World's poor can be raised without bringing the total resource consumption and emissions to an unsustainably high level. Thus, policies to promote a sustainable development typically address issues like the protection of the atmosphere against the accumulation of greenhouse gases, the protection of biological diversity, and the redistribution of levels of material consumption between industrial and developing countries. This scope is also mirrored by the Agenda 21 documents emanating from the Rio conference in 1992.

The above implies that some aspects of environmental policies (for example, the protection of cultural monuments and recreational opportunities) can hardly be grounded on the concept of sustainable development. This does not mean that these issues are unimportant, only that their motivation lies elsewhere than in the sustainability imperative. Of course, policies to promote a sustainable development will have to consider also those more local

and immediate environmental concerns, along with a number of social, cultural, economical and political issues which may constitute obstacles to the implementation of a "pure" strategy for sustainability (see chapter four). A high rate of unemployment, for instance, will probably make it more difficult to mobilize the inhabitants behind strategies for a more ecologically sustainable urban development.

In an urban context, the scope of a sustainability strategy will be different from the one in e.g. a rainforest area. In the latter situation, the focus would probably be at the biological diversity within the area, while in an urban context the emphasis would be laid on the city 's impacts on the surrounding environment. Strategies for sustainable development of urban regions in poor developing countries must also address different problems from those addressed by sustainability strategies for urban regions in wealthy, industrial countries. In the latter cities and regions, the main challenge, from a sustainability point of view, is to reduce the resource consumption, emissions and degradation of natural areas, rather than to increase the inhabitant 's average material consumption level. The discussion below, addressing the situation in European cities, takes this as its point of departure.

The discussion will also concentrate on problems related to the developmental pattern of cities and urban regions. Of course, a lot of other issues are relevant to the question of a sustainable development (e.g. technologies for better pollution control in industrial plants, more energy-efficient vehicles, resource-conserving construction materials etc.).

However, we have chosen to focus on those aspects of sustainability which can be related to specific urban and regional characteristic like the spatial distribution of population, buildings and activities and the networks of infrastructure. This implies that the scope of the discussion will mainly be that of urban and regional physical planning.

What kinds of urban and regional developmental patterns, then, are favourable in the light of the criteria for a sustainable development? Most researchers seem to agree that a dense developmental pattern is favourable when the goal is to reduce the energy use and overall emissions from urban transportation. Australians Newman and Kenworthy (1989) have found a strong negative correlation between urban density and gasoline consumption per capita from their study of 32 cities in different parts of the world. Although the differences in energy use are less pronounced when the comparison is limited to cities which do not vary strongly as to economical and cultural variables (e.g. a comparison only between the 10 North American cities of the sample), a significant correlation between gasoline consumption per capita and urban density still remains. Similar conclusions have been reached from a number of other studies, including theoretical modelling (Rickaby et al. 1992) and empirical studies of smaller towns and villages (Banister 1992).

Also a recent study of 22 Nordic towns indicates that urban planning variables have a significant influence on the inhabitants ' average energy use for transport (Naess, Larsen and Røe 1994). A high population density, particularly in the inner and central areas of the town, is beneficial if the aim is to reduce energy use. When the influences from other physical, socio-economic and socio-demographic variables are neutralized, the analysis indicates that a town with 600 square metres of urban area per inhabitant and a decentralized pattern of residence within the urban area, would have about 70 per cent higher energy use per capita than a town with 300 square metres of urban area per inhabitant and a centralized pattern of residences within the urban area. The study also indicates that the composition of trades and the commuting frequency between the town and its surrounding have equally high influence on energy use as the urban planning variables.

The higher commuting frequency and the higher proportion employed within the manufacturing, building and transportation trades, the more energy is used per capita for transportation.

A close relationship between urban density and energy use per capita was also found in a more extensive, but not so thorough study of the 97 largest Swedish towns (Naess 1993a).

The various above-mentioned studies included large cities as well as smaller towns and villages. The relationship between urban density and energy use per capita, however, was found among the metropols of Newman and Kenworthy's study as well as in the medium-sized and small towns included in the British, Nordic and Swedish studies.

However, it should be noted that urban density only accounts for a part of the variation between cities as to transport energy use per capita. In the above-mentioned studies of Nordic and Swedish towns, for example, maximum 25 per cent of the variation in energy use per capita could be explained from differences in urban area per capita. (Nevertheless, multivariate analyses indicate that the effect from urban area per capita is considerably larger than the effects from the inhabitants' income level or the towns' population size.) Owens (1992) emphasizes that energy-conscious land-use planning must be set within the context of local, national and international policy frameworks if a sustainable urban development is to be achieved. Energy-conscious land use planning will be necessary but not sufficient for the improvement of urban energy efficiency.

There has been some more disagreement among researchers about what developmental patterns would be the most favourable at the regional level, regarding transport energy minimizing. Theoretically, a pattern of moderate-sized, relatively self-sufficient local communities seems to be least transport-demanding (Owens 1986, 1992, Rickaby 1992). If travel costs pose only a minimum deterrent to mobility, however, such a pattern may be likely to be more energy intensive than centralization, because of the potentially large amount of cross-commuting and other travel (Owens 1992). Thus, Cervero (1989) found an extensive cross-commuting between different suburbs in the Chicago metropolitan area and the San Francisco region. This also applied for suburbs with a relatively good balance between the numbers of inhabitants and jobs. On the other hand, an investigation of 15 Swedish commuting regions (Naess 1993a), showed the lowest transport energy figures in the most decentralized regions, in spite of the high overall mobility in the Swedish society. At the same time, the correlation between urban density and energy use found in the study of individual Swedish towns, was confirmed also in the regional study. A decentralized concentration therefore could seem to be the most favourable regional pattern as to transport energy conservation, cf. Figure 3.1.

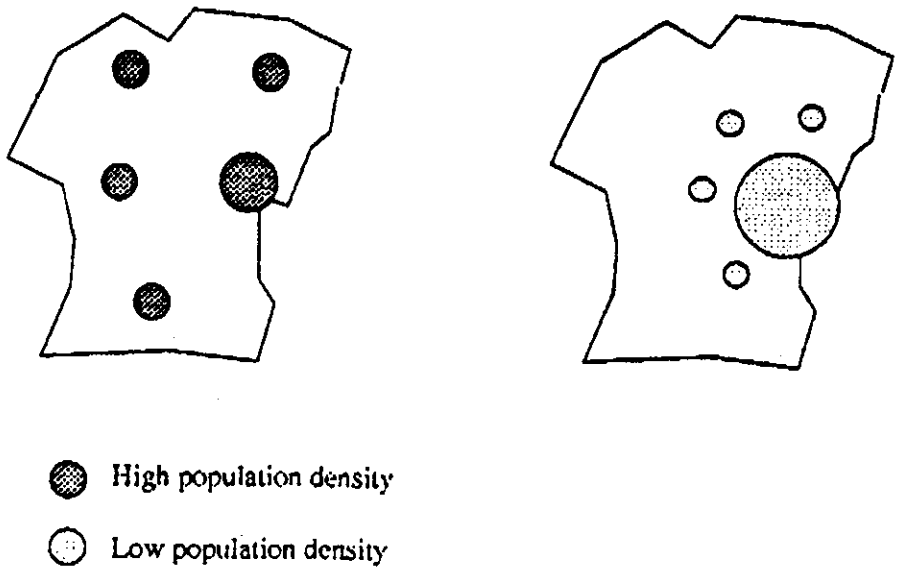

Figure 3.1.
Principal sketch of regional developmental patterns favourable (to the left) and unfavourable (to the right) as to transport energy minimizing.
Poulation *sizes* are symbolized by area-proportional circles. Population *densities* within each urban settlement are symbolized by different shades of grey.
From Naess (1993a).

A strategy for urban developmental patterns aiming at reducing the requirements for transport energy use is well compatible with the objective of minimizing the conversion of and encroachments on undeveloped land. In Great Britain, for example, the Council for the Protection of Rural England has adopted the energy arguments as a part of their struggle to protect "greenbelts" and the landscapes of the countryside against urban expansion (Owens 1991). At the same time, a decentralized concentration, which might be an energy efficient strategy at the regional level according to the studies of Swedish regions, gives more flexible opportunities for development within the limits set by areas worthy of protection within or outside today's urban demarcations. A decentralized concentration could therefore make it easier to channel further development to the parts of the region where the environmental "carrying capacity" is largest (e.g. areas apart from the most vulnerable nature types and ecosystems).

A relatively high urban density also seems favourable with regard to energy saving in buildings. Generally, built forms associated with high densities require less energy for heating. In addition, resource-saving district heating systems such as combined heat and power (CHP) and heating systems based on the heat content in seawater, are most efficient at higher densities. However, extremely high densities may prove to be more energy-intensive than densities at more moderate levels. For example, passive solar energy and other kinds of renewable and local sources of energy, are more easily implemented at moderate or lower densities. At densities up to around 40 dwellings per hectare, however, even those more space-requiring energy supply strategies could be implemented successfully (Owens 1992).

Both the concerns of transportation energy and energy in buildings seem to lead to a conclusion that more dense urban developmental patterns are favourable if the energy use is to be reduced. Urban containment also emerges as an implication from the aim to protect undeveloped areas from being exploited. The conclusion about the desirability of more compact cities is identical with the one arrived at in the European Commission 's Green Paper on the Urban Environment (CEC 1990).

3.4 Criticisms against the proposal of compact cities

The concerns about the inhabitants ' quality of life may - at least partly - push in the opposite direction of the principles arrived at when regarding sustainability from the global and regional level. A strong commitment to the protection of urban green and derelict areas can make it difficult to obtain a high overall density. As mentioned above, high densities can also be difficult to combine with high levels of urban self-sufficiency (e. g. with agricultural products) and solutions for decentralized and local waste management. As pointed to by among others Orrskog and Snickars (1992), local and short circuits for waste management may have an important pedagogical effect, demonstrating to the citizens that no waste simply "vanishes", but returns to nature in more or less desirable ways. Up against the European Commission 's concept of the "compact city", these critics advocate the "green city".

Other critics go even further. Breheny (1992) claims that the European Commission 's Green Paper fails to consider the following six "contradictions":

1) Compact city versus energy efficiency.
2) Compact city versus suburban quality of life.
3) Compact city versus the green city.
4) Compact city versus telecommunication-rich dispersal.
5) Compact city versus renewable energy sources.
6) Compact city versus rural economic development.

As to the first of these issues, Breheny emphasizes that although considerable evidence about the energy efficiency of different types of urban form is available, it does not lead to consensus. He cites the American researchers Gordon and Richardson (1990) who claim that economic variables are the determinant factors influencing transport energy use, not land use variables. They also criticize the study of Newman and Kenworthy (1989) for overemphasizing the journeys to work at the expense of the increasingly important nonwork journeys.

However, the lack of consensus on the relationship between urban form and energy efficiency is mainly about the consequences of different structures of centres and subcentres within the urban area. Theoretical modelling usually concludes that a multi-nuclear centre structure within the urban area would be the most energy efficient pattern, while the empirical investigations of Newman and Kenworthy concluded that one strong city centre would be favourable as to energy saving. Owens (1986) assumes that the conclusion to the question about the structure of centres within the urban area will be similar to the conclusion about energy-efficient patterns of development at the regional level: The level of mobility will probably determine whether a centralized or a decentralized pattern is most energy-efficient. The above-mentioned study of 22 Nordic towns does not show any clear effects on energy use from the structure of centres within the urban area. However, the number of towns with a distinct multi-nuclear structure was low, and the results concerning this variable must thus be considered as uncertain. This is obviously a field where more research is required.

Recognizing a relatively high extent of uncertainty about the energy consequences of different internal patterns of location within the urban area, the consensus is significantly larger about the relationship between urban density and energy use per capita. In contrast to Gordon and Richardson (1990), the studies of Swedish cities (Naess 1993), and Nordic cities (Naess, Larsen and Røe 1994) indicate that land use variables (particularly urban density) have a far greater influence on the inhabitants ' average energy use than economic variables like income or gasoline price. These studies were based on data for the total fuel consumption for transportation within each city, thus including both work-related and nonwork journeys.

The conclusions from the above-mentioned studies at the city level are supported also by studies at lower geographical levels (households, residential areas and districts within the city) (Newman and Kenworthy 1989, Holtzclaw 1990, Næss, Røe and Larsen 1993).

Some other researchers have argued that a dispersed and ruralized pattern of urban development may lead to higher local self-sufficiency within the smaller subunits of the urban area, and thus contribute to a reduced need for transportation (Orrskog 1993). If such low density, decentralized patterns are to produce lower transport volumes, people will have to be more locally oriented, to a high extent renouncing on the freedoms of choice characterizing today 's cities as to job market opportunities, services, cultural events, etc. Those who claim that low-density, dispersed cities can be energy-efficient, seem to presuppose rather profound changes in people 's lifestyles and/or heavy restrictions on mobility.

Breheny 's second contradiction (incompatibility between the compact city and suburban quality of life) is largely an irrelevant argument as to what kinds of developmental patterns are ecologically sustainable or not. It is not a criterion of sustainability that all prevailing preferences as to life-styles (e.g. automobile-based and area-consuming residential preferences) should be met. Certainly, the welfare criterion is an important part of the concept of sustainability. This criterion, however, refers to the basic human needs, and should not be interpreted to include a material consumption that can only be sustained as long as the goods in question are available only for a privileged minority of the global population. However, the strong preferences in many European populations for the detached one-family house and the freedom of private mobility constitute important obstacles for a sustainable urban development. Such obstacles will be addressed in the next chapter.

The contradictions between the compact city and the green city have in part been dealt with above. As mentioned, it is problematic in a sustainability perspective to promote the protection and expansion of green areas within the city to an extent that increases the inhabitants ' dependence on a globally unsustainable energy use. Besides, unless all further construction is halted, there will always be a trade-off between protecting natural and undeveloped areas within the city boundaries against in-fill developments, and the protection of undeveloped land outside the city against urban expansion. If in-fills and density increases could be channelled to sites where technical encroachments have already taken place, the contradiction between the green city and the compact city might perhaps be resolved. Studies in three Norwegian towns indicate that a high proportion of the needs of future construction could be met by utilizing low-density and derelict industrial sites, landfill areas etc. Furthermore, a large amount of urban land is currently being earmarked for the private car. If the aim is to reduce car traffic in urban areas, it is neither necessary nor desirable to earmark such large areas for roads and parking as today. Such areas might instead be conversed into sites for new dwellings, or be turned into new green areas/alleys through planting (Naess 1993b).

Converting asphalt into green areas should in particular be considered in dense, inner-city residential areas where the availability of parks and other vegetation-covered areas is poor. For social and welfare reasons, it also seems reasonable to avoid further density increases in the most densely populated parts of larger cities, even though such density increases might appear favourable from mere transport energy considerations.

Breheny 's fourth contradiction deals with the prospects of telecommunication, emphasizing the potential of new communication technologies to facilitate a decentralized, new life-style. According to this view, the need for face-to-face contact provided historically by the city is now obviated by telecommunications. Robertson (1990) argues for continued urban dispersal, the reaffirming of rural values, and the use of new facilitating technologies. The crucial point in a sustainability perspective is, of course, whether the saving in travel, and hence energy use, that result from "telecommuting" exceed the energy use resulting from the greater distances travelled. Views on this vary. Gillespie (1992) doubts that a net benefit would ensue, also pointing to that the range of telecommunication facilities in rural areas will always be limited, because they inevitably focus on the major nodes, i.e. the cities. Communication also involves many other aspects than the mere exchange of written or spoken information, and telecommunication can hardly cater for all these social aspects of communication.

The fifth argument against the concept of compact cities refers to the possibilities of utilizing renewable energy sources. As mentioned above, it is evident that the possibilities for passive solar heating are higher at lower densities, although the significance of this argument has sometimes been over-emphasized (Owens 1992). It also seems easier to facilitate the usage of geothermal energy when densities are not too high. On the other hand, district heating systems require a certain minimum density to be economically feasible, because too large proportions of the energy are lost when the network of distribution pipelines gets too long. Furthermore, active solar energy may be collected in centralized collector plants as well as from solar panels in individual buildings. It can also be argued that from a sustainability perspective, priority should be given to efforts that can reduce the needs for energy supply, rather than to the utilization of new energy sources. In this context, building forms associated with higher densities have an advantage, as mentioned above.

Breheny 's sixth critical argument against urban containment addresses the question of rural economic development. It can be argued that the compact city proposal would put at a disadvantage those people living in what are already economically declining or marginal rural areas. On the other hand, the compact city might help to regenerate inner urban areas, and thus redistribute benefits in favour of those residents who are currently disadvantaged by decentralization (Breheny, ibid.). The possible negative effects from a compact city strategy would also be mitigated if, as we have suggested above, the compactness of each single town or village were combined with a decentralized developmental policy at the regional level. In such a strategy, investments could be allocated (through regional and environmental political measures) to a large number of larger or smaller urban communities, without having to transform the countryside into an energy-intensive and land-consuming suburbia.

3.5 Urban and regional infrastructure

In this section, our scope will mainly be the infrastructure for transportation. However, we shall first shortly discuss the infrastructure for water and sewages.

The question of infrastructure for water, sewages and waste is closely related to the question of ecological circuits, and to the discussion on how much emphasis should be put on the objective of establishing as short and local circuits as possible. One, more technically oriented, view will usually emphasize the advantages of large, centralized treatment plants where different kinds of waste can be sorted and recycled in a proper way. The more locally oriented fraction advocates small, decentralized solutions, where organic and inorganic waste can be sorted at the source, and organic matter can be brought back to earth within the local neighbourhood as compost. The latter strategy demands more open space within the built-up areas (cf. the previous section) but does not require much high-level technical infrastructure. Local sorting and treatment of waste implies that each individual is made more responsible for the treatment of waste. This model thus can have a pedagogical potential as to environmental issues. In a situation where the waste from households contains increasing amounts of heavy metals and other poisonous chemicals, however, the strategy based on local compostation and infiltration is more problematic.

In many urban areas of Europe, large investments are presently allocated to the construction of new infrastructure for transportation. Although some of the investments are earmarked for improving the infrastructure for public transportation, the dominating part of the resources are spent on construction of new roads. Building new roads in urban areas has been based on regards both to accessibility and to environmental protection. By locating major roads so that residential or central areas are by-passed, the latter areas can be relieved from through traffic. In addition, it has been claimed that new roads in urban areas will contribute to a reduction of the overall energy use and emissions from traffic. This conclusion is based on the assumption that increased road capacity reduces congestion and thereby has better-flowing traffic as a result. With free-flowing traffic, each vehicle can move in a more fuel-economic way, and in sum this is supposed to lead to lower total energy use and emissions from the urban area.

However, the impacts on energy use and emission from transport technical efforts like e.g. new road construction should not be analyzed only at the level of individual vehicles. Newman and Kenworthy (1989) point to four different levels that should be considered when studying the energy use for transportation in cities, each with different policy strategies:

a) Within the vehicle (mechanical engineering)
b) Vehicle to vehicle level (traffic engineering)
c) City zone level (transport planning)
d) Whole city (urban planning).

A danger of fallacies occurs when knowledge from the two first levels is accepted as sufficient for assessing consequences also at the two latter levels. Instead of the simple linear causality between free-flowing traffic and reduced overall energy use and emissions, it is necessary to take into consideration a number of feedback mechanisms which may modify or change the effect. With easier-flowing traffic, more people may find it convenient to travel by car, and the distances travelled may also increase, i.a. as a result of land use changes motivated by the new road capacity. Increased automobile usage and increased travelling distances may in their turn lead to less people walking and cycling and to fewer trips by public transportation. All these latter consequences contribute to an increase in the overall energy use and emissions from the urban area.

There is some empirical evidence indicating that the effects from increased road capacity on the fuel-consumption and emissions per vehicle kilometre tend to be outweighed by the above mentioned side effects. Energy efficient traffic is not the same as energy efficient cities. New main roads in urban areas can in some cases give reduced local traffic and environmental problems, but most often they contribute to an increase in the overall energy use and emissions from transportation within the urban area. Among the cities in Newman and Kenworthy's (1989) study, the cities with the most free-flowing car traffic had the lowest percentages of trips accounted for by public and non-motorized transportation, and the highest transportation energy use per capita. Newman and Kenworthy found similar correlations when comparing different districts within an individual town. Mogridge (1985) claims that large road investments in urban areas often have little or no effect on driving speeds. According to Mogridge, most Western cities have a large potential market for increased automobile usage. New road capacity therefore tends to be quickly filled up, the traffic flow remains nearly as before, but a lower percentage travel by public transportation. Based on studies in 143 cities in the OECD countries, a recent report from OECD and the Organization for the Ministers of Transport in Europe (ECMT) concludes that urban road construction has led to a significant increase in the emissions of carbon dioxides. The report also indicates that road construction has increased local pollution and noise, as opposed to what was expected by the local authorities (OECD/ECMT 1993).

In addition to the above mentioned consequences, increased road capacity is space-demanding. Urban highway construction often implies that existing buildings have to be demolished, or that urban green areas are covered by asphalt. The buildings superseded by new roads have to be compensated for elsewhere. In this way, urban road construction also makes it more difficult to contain the urban built-up area. At the regional level, increased road capacity may facilitate increased cross-commuting between neighbouring towns and villages. Besides, new roads are in themselves encroachments in the landscapes of the countryside.

Compared to ordinary road construction, improving the infrastructure for public transportation (e.g. railway lines, tramcar or subway lines, separate road lanes for buses) is more favourable in a sustainability perspective, due to the significantly lower energy use and emissions per passenger km in public transportation than in private car traffic. However, also public transportation consumes energy and produces emissions. In the absence of restrictions on private motoring, a strengthened public transportation may in fact contribute to an increase in the emissions of greenhouse gases (OECD/ECMT 1993).

3.6 Conclusions

The following conclusions emerge from the sections above:

A sustainable urban development must ensure for the urban and regional population an acceptable level of welfare, which can be sustained in the future. At the same time, the city 's and the region 's development must not be in conflict with a sustainable development at a supraregional level.

These requirements imply that a sustainable urban and regional development must secure:

1) A reduction of the city 's and region 's per capita energy use and emissions, towards a level compatible with the ecological and distributional criteria for a sustainable development at supraregional and global level.

2) A minimizing of the conversion of and encroachments on natural ecosystems and biological resources within the urban region.

3) A replacement of "open-ended" flows where natural resources are transformed to waste, with "closed circuits" relying to a higher extent on local resources and recycling wastes at as local a level as possible.

4) A sound environment for the city 's and region 's inhabitants, without pollution and noise damaging to the inhabitants ' health, and with sufficient green areas to give opportunities for the population to experience and get emotionally related to nature.

If these objectives are to be achieved, it seems necessary to avoid further urban sprawl. However, a strategy for more compact cities should be cautious as not to decimate important elements of urban nature. Density increases should mainly be allocated to sites where technical encroachments have already taken place, e.g. low-utilized and derelict industrial sites, ecologically undesirable parking and road areas, etc. The utilization of each single building site should not be too low, but an energy-efficient pattern of development does not require extreme high-rise buildings.

At the regional level, a decentralized pattern of residence seems ecologically favourable, provided that each individual town and village has sufficiently high population density.

Even if additional urban sprawl is avoided in the future, the existing low-density areas still represent a challenge by virtue of their high car-dependence. A possible strategy might be to try and develop urban subcentra at nodes in the public transportation network, thus giving opportunity for local jobs while at the same time reinforcing the basis for the affected public transportation routes (Newman 1992, Orrskog 1992).

Increased road capacity in cities and urban regions is problematic from a sustainability point of view. A strategy for strengthening public transportation should be combined with economic and physical restrictions on private motoring in urban areas.

4. *Planning for a sustainable pattern of development in urban regions : barriers, conflicts and opportunities*

If a sustainable urban development is to be implemented, significant political, institutional, cultural and social barriers will have to be overcome. A sustainable urban development will require a strong coordination and control at the national level and binding agreements at the international level. Supranational and national strategies, however, rely heavily on the implementation at local levels within the frames of national policies. Current environmental policies in most European countries are still rooted in a "technocentric" view. However, the recommendations of the Brundtland report go beyond the traditional scope of "technocentric" environmental policies. Several studies indicate that measures favourable to a more sustainable urban development may be quite controversial. Changed value priorities among people seem to be a basic requirement for a more nature- and environment-friendly course in urban development. Environmental strategies that have relatively strong support, may nevertheless be considered unlikely. Limitations on private mobility and the consumption of land for urban development will easily conflict economic interests aiming at the encouragement of consumer demand and the development of individual opportunity and mobility. If urban planning for a sustainable development is to be feasible, sustainability must gain status as a main concern in society. Planning for sustainability must be oriented towards long-term and global goals, but should not rely solely on technical and instrumental rationality. A broad spectre of planning strategies should be employed in planning for a sustainable development, contingent on the concrete planning situation. A "precautionary principle" for ecologically defensible decisions could be to choose those courses of action that, based on todays state of knowledge, minimize the negative impacts on the environment, and at the same time minimize the negative environmental consequences if the basis of knowledge should prove to be erroneous. Research and discussion should be directed to increase the insights into issues of relevance to a sustainable urban development.

4.1 Introduction

Planning for a sustainable regional/spatial development in urban areas requires that measures are made use of which intend to i.a. minimize energy use and globally/nationally significant pollution, conserve land and valuable biological resources, reduce local noise and pollution problems etc. Many of these measures will affect human activity and patterns of behaviour, and the effects will vary significantly between socii-economic groups. The types of measures needed and the profile of social impacts will depend on the local and regional contexts.

For urban-regional development to change on to a course compatible with objectives set by the urge of a sustainable development, significant political, institutional, cultural and social barriers will have to be overcome. Moreover, scientific research on land-use, construction and development principles satisfying superior regards to environment and natural resources is only recently started, and results are so far selective with respect to economic, social and political context .

Different national and regional contexts require specific treatment in order to take into account the concrete socio-political, economic and spatial conditions for implementation and to utilize opportunities that are specific to the situation of particular regions or countries. Generally there is a lack of environmentally favourable models, and policy will to a certain degree have to be experimental.

Conflicts of interest may represent a severe barrier. Attitudes towards environmental measures in urban/spatial planning are shown to vary greatly by social position and general political orientation, and several important measures have relatively little support among the population in general (Næss 1993b). Apparently there is also a conflict between the general development towards political-institutional regimes that aim at recovering economic growth by providing more freedom of individual economic action, and the need of restraining certain individual freedoms to respect the limitations on human activity placed by environmental and energy considerations (Johnston 1989, Naustdalslid 1992, 1992a).

In a situation of rapidly increasing global economic competition and poor growth perspectives national economic development agencies will become more preoccupied with the economic role of cities and city networks. The economic efficiency of the urban network will become a major focus to policy makers. Increasingly national economies are becoming an aggregation of their urban economies, and competition is concentrated within the urban system. The challenge of generating a well performing and competitive national economy will more and more depend on the economic potential of the urban economy. Priorities may easily be influenced more by short-term economic "necessity", rather than the sustainable, but more innovation and planning demanding path to compatibility between economic goals and environmental requirements.

The global distributional aspects of the sustainability concept (e.g. reduction of the energy use of industrial countries in order to facilitate economic development in the Third World within the limits of a sustainable global energy use) is another potentially controversial issue.

The purpose of this chapter is (1) to draw up some important guidelines for a planning and development policy with an ambition to fulfil the objectives stated in chapter 3., (2) to identify the most important barriers, conflicts and opportunities influencing the implementation of such a policy, and (3) to state the most critical problems requiring intensified research effort and international cooperation for their solution.

4.2 A holistic and long-term planning is required

If a sustainable urban development is to be achieved, a coordination of efforts in different sectors and at different administrative levels is required. In order to achieve an energy efficient pattern of development, for example, land-use planning needs to be combined with investments in transport facilities as well as fiscal and regulatory constraints on private vehicles. Policies imposed in isolation are likely to have unintended effects. There is a reciprocal interaction between land uses on the one hand, and transport policies on the other hand. For instance, density increases in the inner urban areas might result in a worsening of local traffic-related environmental problems unless they are accompanied by a transition from car driving to increased use of public and non-motorized transport. Similarly, a conversion of road and parking areas in order to facilitate density increases compatible with the protection of urban green areas, will only be possible when integrated with a policy for traffic restraint in urban areas. Furthermore, making cities unfriendly to

cars may lead not to the intended modal shift but to energy-intensive development in out-of-centre locations, if the traffic restraint in central areas is not combined with appropriate planning policies. And when individual cities pursue sustainability goals in isolation, there is danger that energy-intensive and environmentally damaging activities (for example, dispersed growth) will simply be displaced (Owens 1992, Naess 1993b).

A consistent preference of measures compatible with a sustainable development assumes that the public authorities to a much greater extent than today, are setting the conditions for land use, construction and transport. Individual agents wishing, for example, to establish new shopping malls along the highways or to sell dwelling sites in areas where residential development is undesirable from a sustainability point of view, must be hindered from realizing their intentions. It is also necessary with a strong and coordinated control to secure that the development results in local densities compatible with a sustainable development and to be able to combine an efficient site utilization with the protection of natural elements within the built-up areas. Not least, the restrictions on private motoring required to reduce energy use and emissions from traffic, imply a considerable curtailment of individual freedom. (The degree to which such regulations will be perceived as inferior curtailments or legitimate measures, will of course depend heavily on the predominating lifestyles and value priorities among the population.)

A sustainable development also implies that today 's inhabitants in European cities should reduce some of their material consumption (particularly the consumption of fossil fuels) to the benefit of future generations and people in poor countries of the world. These conditions require that policies are based on a much more long-term perspective than in traditional planning and management, and that a more equal global distribution of benefits is secured by international agreements and institutions. Such agreements and institutions are also necessary to counteract the "tragedy of the commons" and "prisoner 's dilemma" conditions that today constitute strong disincentives against altruistic action by single nations in order to promote common and global objectives:

In the absence of binding regulations at a supranational level, one single nation unilaterally trying to reduce its contributions to global environmental problems has no guarantee that other nations will follow its example. The pioneer nation thus risks that its sacrifices have only marginal effects on the global environmental problems. Within the context of an international free trade market, the domestic economic consequences of such altruistic policies may be severe, as the environmental pioneer nation will probably reduce its ability to compete economically with other countries.

In summary, the above-mentioned arguments suggest that a sustainable urban development will require a strong coordination and control by public authorities at the national level, and binding agreements and supranational steering agencies at the international level (Johnston 1989).

However, international agreements need to be implemented at local levels within the frames of national policies. Administrative and economical instruments at the local and regional level must be used as tools to promote a sustainable development within such frames. A supposition for this is a sufficiently high legitimacy among the local population for strategies aiming at global sustainability. Local planning processes should be arranged in ways that stimulate to a broad debate about what implications the goal of a sustainable development might have for the local community.

4.3 A change to a more ecologically oriented environment-political paradigm is necessary

Environmental policies may be divided into two poles: A technocentric view versus an ecocentric view (O 'Riordan 1981).

The technocentric view is based on a conception that the environmental problems can be controlled through humanity 's control over nature. Aided by knowledge about causal connections in nature and about the relationship between nature and society, rational action is supposed to enable us to correct the course of development and repair the damages imposed on nature through human activity. Technological efforts (e.g. catalytic purification of automobile exhaust fumes) are an important part of this perspective. The background for environmental policies is primarily the concerns about the health and welfare of the domestic population. Distributional questions, like the distribution of benefits and costs between present and future generations or between industrial and developing countries, are downplayed or neglected. The environmental strategies may to some degree include changes in society 's institutions, but these changes are supposed to be goal-oriented and controlled, without conflicting fundamentally with our political and economic system.

Within the ecocentric perspective, nature is basically validated independent from humans. While the technocentric perspective postulates the supremacy of humans over nature and seeks to find ways for humans to manage this dominion in a way not leading to ecological collapse, the ecocentric perspective rejects the idea that humans are entitled to exercise a supremacy over nature. For some ecocentrists, this is primarily an ethical or ontological issue, where nature is awarded an intrinsic value, and not validated only as a resource for human purposes (A. Naess 1976, Fox 1990). For others, the question is a more pragmatic one, where - based on ecological and malthusian thought - non-human nature is considered as a closed system where the primary contribution from humans has been to disturb the natural adaption of this system (Massachusetts Institute of Technology 1972, Commoner 1972). In this perspective, it is not only insufficient to reform existing institutions. Here, institutional changes imply a dramatic change in the entire fundament for contemporary modern societies. Economic growth and accumulation as traditionally interpreted, is rejected. Instead, ideals are sought from inter alia pre-industrial and non-Western cultures (Naustdalslid 1992).

The report from the Brundtland commission can be interpreted as an attempt to bridge the gap between the technocentric and the ecocentric perspective. The Brundtland commission 's concern about long-term sustainability and global equity correspond to the ecocentric view, while the emphasis on continued economic growth - albeit with a new content - is clearly rooted in the technocentric view. The commission 's perception of nature is also basically anthropocentric. Nevertheless, the Brundtland report represents a significant step away from the technocentric pole.

However, current environmental policies in most European countries are still deeply rooted in the technocentric view. (In some countries, the perception of environmental issues may even be more or less characterized by a "cornucopian " technological optimism believing that possible environmental problems may be overcome without a deliberate public environmental policy.) According to the technocentric view, there is at present no environmental crisis. The solution to environmental problems will partly be remedial, partly a better balancing between environmental regards and developmental interests. Such a balancing, however, must take place within conditions set by the economic system (Jansen

1989). The state has to legitimate its policies to economic interests which are mainly profit-oriented. This implies, among other things, a strong emphasis on the right of individual landowners to develop their areas in a profitable way, and a strong commitment among public authorities to support - or at least not to obstruct - initiatives that may contribute to economic growth.

If the state, in spite of this, shall be able to implement an environmental policy deviating from what is desired by the dominating economic agents, a pressure from the public opinion will be crucial. Thus, a change of environmental policy depends closely on the environmental consciousness among people.

4.4 A change in value priorities is essential

Several investigations suggest that the present public opinion in favour of measures compatible with a sustainable urban development may be relatively weak. Certainly, a number of surveys indicate that there is a substantial general goodwill towards environmental protection (cf. i.a. UNEP 1990). However, when people are asked about their attitudes to concrete environmental measures in urban development, the willingness to prioritize environmental regards decreases significantly.

Breheny (1992) points to the fact that the life-style chosen in practice by most residents in European cities, is the suburban way of life. An English investigation of residents ' valuation of different features of their dwellings (Rydin 1992) shows that environmentally positive features such as space for recycling, cycleways in the neighbourhood, environmentally friendly building materials and space for bicycles, were not valued at all by a large majority of the occupiers. In contrast to this, space for a car was the highest valued feature, followed by garden for recreation and visual pleasure. The investigation also suggests that the occupiers and the house-buying public are less concerned with environmental properties of the dwellings than the estate agents. The interest in promoting or favouring dwellings more compatible with sustainability ideas was also low among mortgage lenders.

A Norwegian study of opinions in the population about various measures in urban development (Naess 1993b) shows little support to policies which may be perceived as negatively affecting the individual 's level of consumption or opportunities for personal choice. There is a considerable scepticism to seek a concentrated developmental pattern, particularly to density increases in residential areas. Most of the respondents are also negative towards reducing the construction of single family houses in favour of a stronger commitment to undetached houses and low-rise apartment buildings. There is a common desire for new residential areas in country-like surroundings. Halting further development of the road and parking capacity is not very popular, and there is a heavy resistance against introduction of restrictions on traffic.

The "environmental measures" which are popular are those which are not perceived as a threat to the consumption and behavioral pattern of each individual, e.g. strengthening the public transportation and establishing a continuous greenway and walk/bikepath system in developed areas. A tendency can be seen among the respondents to look with relative favour to parts of the "environmental measures", while they are not willing to down-size those traits of today 's urban development which conflict these measures. The Norwegian study also indicates that the willingness to prioritize "environmental measures" at the expense of "trend measures" is stronger among municipal politicians than among voters, and greater

among municipal employees than elected officials. In particular, planners and bureaucrats are more positive than the population in general towards measures in favour of a more concentrated developmental pattern.

A German study (Brög 1992) indicates a higher willingness among people to prioritize public transportation at the cost of private motoring than what was found in the above-mentioned Norwegian study. The German study also suggests that the population in general may be more willing than experts and politicians to restrict car usage. However, the possible restrictions on auto use were less specified in the German investigation than in the Norwegian. Some of the discrepancy may also be due to difference in town sizes, as the German study included large cities, while the Norwegian research areas were small towns with sizes from 5000 to 150 000 inhabitants.

The prevailing preference for continuous development of single family homes, experienced both in the Norwegian and in British studies, may seem a little surprising as the household needs are no longer dominated by the nuclear family. In Norwegian towns, only around 30 per cent of the dwellings are presently occupied by households consisting of more than two persons, and the percentage of large households is still declining. According to the British Department of the Environment, 85 per cent of new households in the United Kingdom by the year 2001 will be accounted for by single people. However, these tendencies do not necessarily imply a change towards the construction of smaller housing units. Building of new, large single family homes results in "moving chains", which on the other end of the standard scale provides a trickle of smaller dwellings to the housing market. The demands on the housing market seem to emerge to a higher extent from those who already have a dwelling and want to improve their standard (cf. chapter 2.2) than from newly established households who for the first time seek an own dwelling.

A British study among planners at different geographical levels (Owens 1991, 1992) indicates that environmental issues now receive much more attention than in the past, but that these concerns have not yet been converted into policy in any meaningful way. There also seems to be a considerable uncertainty as to the legitimacy of attempts to improve energy efficiency through land-use planning. Nearly half of the authorities at the district level felt that energy efficiency was not a land-use planning issue, or at least that it was not traditionally perceived as such. A similar impression emerges from the above-mentioned Norwegian study, where the attitudes to area-conserving residence types vary to a much smaller degree according to traditional dividing lines in environmental politics than the attitudes to more traditional environmental measures like the promotion of public transportation and parks/open space. One reason for the relatively low support to measures for a more energy-efficient and less land-consuming urban development, may therefore be a general lack of public debate about the environmental consequences of different patterns of development.

In our opinion, changed value priorities among people are a basic requirement for a more nature- and environment-friendly course. Without changed value priorities in the general public, politicians with a platform placing the environment at the top of the agenda will not achieve a position of power. On the other hand, if most people do not prioritize nature and environmental values stronger than is done today, a government which attempts to implement a sustainable urban development will quickly lose its legitimacy.

4.5 Obstacles to a sustainable urban development

As can be seen from the above, the willingness among different population groups to prioritize environmental measures in urban development presently seems to be rather moderate. In part, this reflects the general value priorities dominating in society. But what if people's valuation of environmental and sustainability objectives was significantly increased, for example as a result of campaigns to increase the environmental consciousness: Would it still be difficult to implement policies favourable to a sustainable urban development? Do mechanisms and driving forces exist that may hinder such policies, even if they were backed by political will and support in the opinion?

Under present technological regimes a sustainable development means a severe reduction in the use of personal transport, a change in agricultural practices, restrictions on the consumption of nonrenewable resources in consumer goods, a reduction in energy supply, an emphasis on reuse and recycling, and heavy restraint on polluting activities. Such changes cut right across the grain of modern capitalist industrial economies which are designed to maintain economic growth by the exploitation of resources, the encouragement of consumer demand, and the development of individual opportunity and mobility (Blowers 1992).

In the Norwegian study of attitudes and opinions concerning urban development (Naess 1993b), experts and politicians were also asked about what kind of urban development they thought was most likely to occur. The answers show that certain "environmental measures", which have relatively high support, are still not considered realistic to implement. For most of the "trend measures" the situation is opposite: here implementation is considered more likely than desirable. These deviations between wanted and expected development are indications of obstacles that can make it difficult to obtain a change in the course of direction towards more priority on the environment.

Many of the respondents think that a concentrated urban development with area-conserving dwellings and restrictions on automobile traffic will be perceived as an unacceptable curtailment of the freedom of the individual. Many also think that fears among politicians regarding making unpopular decisions will be an important hindrance to implementing such an urban development. A significant proportion of the respondents also believe that such a development will break with well established expectations about material consumption and prevent groups with strong purchasing power from realizing their wants. A lack of willingness to take global concerns into consideration when these conflict local needs is also mentioned by many as a hindrance.

The respondents look upon conflicts with the interests of land owners as a major obstacle for obtaining a concentrated developmental pattern with emphasis on density increases. On the other hand, few of the respondents see resistance from sector authorities or decree from higher level government as an obstacle for a more nature- and environment-friendly urban development.

In spite of the obstacles mentioned above, a multitude of grassroot initiatives aiming at more sustainable urban and regional development have arisen in later years. For example, a number of so-called eco-villages have been built, where residents are experimenting with alternative models for ecological and social organizing of their neighbourhoods. Although some critical remarks might be raised from a sustainability point of view against certain aspects of these initiatives (notably regarding their neglection of the transportation consequences of locating new residential villages in rural areas), they reveal a strong

willingness to respond to the challenges of a sustainable development. Another evidence of popular willingness to take environmental regards, is the successful implementation in many European countries of recycling routines, where the members of each individual household sort their wastes into categories that can be recycled (paper, glass, organic matter etc.) or have to be treated in special ways (mercury thermometers, some kinds of batteries etc.). With more information and debate about environmental consequences of urban and regional development, a stronger popular concern could maybe arise even for these latter issues.

A European study of opinions among experts involved in transport and communication planning (Masser, Svidén and Wegener 1992) shows that a majority of the experts would prefer an "environment" or an "equity" scenario for urban development rather than a "growth" scenario. However, the "growth" scenario was considered by far the most likely scenario. This gap in the opinions about what is likely and what is desirable was found across national and educational differences among the experts.

Even if the national authorities do not actively put hindrances to a sustainable urban development, lack of support from higher-level government may be perceived locally as an obstacle to environmental measures. This is underlined by Owens (1992), based on investigation of energy considerations among planning authorities at different administrative levels in England. According to Owens, one of the most important factors inhibiting a more energy-conscious planning is the lack of a statutory framework and policy guidance from the Department of the Environment to require and legitimize consideration of energy efficiency as a land-use planning issue. A number of authorities at the district level felt that refusal of an application on the grounds of energy efficiency would not be upheld on appeal, and several added that costs might be awarded against the local planning authority.

Restrictions on private mobility and replacing construction of single family homes with the building of more resource-saving types of housing imply a reduction in the consumption level within sectors that make up a high proportion of the total private consumption. In Norway, for example, the account items "Residence, lighting and energy for heating" and "Transport and travel" together amounted to 46 per cent of the money spent by private households in 1989. A change to more sustainable solutions within transport and housing policies would thus imply reduced markets within sectors of significant importance to the national economy, and reduced economic growth would be a likely consequence. In the light of this, it is maybe not so surprising that nearly 80 per cent of the bureaucrats and politicians in the above mentioned Norwegian study believed that a high-level government environmental control over the economy would be a prerequisite for implementing a concentrated urban development with area-conserving dwellings and restrictions on car use.

Within planning literature, there is a considerable disagreement about the extent to which public authorities are actually able to control urban development through planning. Scepticians (e.g. Wildavsky 1973, Reade 1982) claim that most attempts within public planning should be characterized as failures. Others (e.g. Alexander 1981, Sejersted 1990) have a more optimistic view. According to the latter group, physical planning is a field where the prospects for planning agencies to have their plans implemented are better than in many other fields of planning. Some Norwegian empirical investigations tend to support this view, at least regarding the determination of borderlines between urban and rural areas (Ellefsen and Røsnes 1990).

However, for several reasons the planning practice in most European countries has clear incremental traits. Even though the urban development may be implemented according to plans, the plans themselves are often revised, and their content is determined from short-time bargaining rather than from considerations of long-term goal achievement. Such a mode of planning may be well suited to pluralistic societies with unstable and diverging goals, but is less favourable when the challenge is to maintain the long-term and collective interests associated with a sustainable urban development. According to Elmore (1980), the prospects of implementation are best for plans concentrating on problems perceived as important by local decision-makers. This implies that a plan attempting to take into consideration global and national environmental objectives at the cost of local interests and agents, is less likely to be implemented than a plan emerging from the local opinions about "where the shoe pinches".

Experience from the post-war reconstruction period suggests that comprehensive and goal oriented planning is feasible if the political consensus is high and the purposes of the plans are compatible with the economic dynamics in society. If urban planning for a sustainable development is to be feasible, sustainability must gain status as a main concern of society. If measures to promote global and long-term environmental goals can also contribute to a short term improvement of the local environment, the possibilities to further a sustainable development through urban planning may be better.

4.6 Planning strategies for a sustainable development

An overall strategy for societal change towards a sustainable development should be the stimulating of a broad and open debate about the consequences of current development and alternative courses of action. Information from environmental research will be important inputs for this debate, but value-oriented and ethical issues are probably the most important items to be discussed. The purpose of the debate should be to increase the substantive rationality in society, by trying to answer inter alia the following questions (Flyvbjerg 1992):

* *In which direction are we going?*
* *Who wins, and who loses?*
* *Is it desirable?*
* *What should be done?*

Planners may employ a range of different planning styles. A common classification distinguishes between synoptic (rational comprehensive) planning, incremental planning, transactive planning, advocacy planning and radical planning. According to an evaluation of these procedural strategies against criteria for a sustainable and democratic development (Naess 1994), a broad range of different planning styles should be employed in planning for a sustainable development, contingent on the concrete planning situation. Elements from different planning styles could also preferentially be combined in one particular planning task.

The study concludes that the possibilities for synoptic planning (aiming at rationality in problem analysis, goal formulation, alternative generation, and evaluation and comparison of alternatives) should be taken the maximum practical advantage of when the determination of the overall pattern of development within the municipality is on the agenda. The implementation of the plans could be done in smaller steps, with feedback loops to facilitate that experiences from the implementation are incorporated in adjusted

plans for the future development. Possibilities for adjustments will also be at hand when compiling detail plans, where i.a. local natural conditions may indicate that houses and roads should be designed a bit different from what was supposed in the master plan.

Even though it will never be possible to elucidate any possible consequences of a plan, the most important kinds of impacts from master plans on nature and the environment should become the subject of formal Environmental Impact Analyses. There is a need of empirical research that can increase the knowledge base for such analyses. Techniques suitable for goal achievement analyses of plans seen from the points of view of different interest groups (MAUT-methods, cf. Edwards and Newman, 1982) should be employed to a higher extent.

The goal formulation, being a central element in synoptic planning, should be done in dialogue with local organizations and higher-governmental authorities. Also in the proceeding stages, it is desirable with as open and dialogical a planning process as possible, inter alia by employing matrix-organized project work groups and through public meetings giving lay people an opportunity to have their words heard.

Such a strategy from the official municipal planning authorities should be combined with advocacy planning directed by non-governmental nature and environmental organizations and neighbourhood organizations. It is desirable that public authorities contribute economically to such planning, but without putting conditions for the support that threatens the autonomy of the organizations. The advocacy planning should be organized as a communicative process within the organizations, involving the members to as high an extent as possible. The emphasis on dialogue must not imply the rejection of instrumental analysis of alternative plans and their environmental and other impacts. Without knowledge about the consequences of different measures, the discussion about the measures becomes less interesting, and the possibilities for manipulation increase.

There is also a need of radical criticism of the development of society and the present function of planning. The possibilities to put forward such criticism is largest for planners and theorists outside thee public bureaucracy. Empirical planning research on agents and driving forces may bring important premises for this discussion. Radical planning theorists also have a responsibility to contribute to a theory development and debate about how an effective management to achieve collective goals could better be reconciled with the protection of civilian and political rights.

In addition, practical testing of alternative principles for physical and social organizing of local communities is desirable. Such projects, which depend on local initiatives, may contribute to the creation of a debate. For the experiments to result in increased knowledge, however, more systematic evaluations are required than what has been the case so far.

4.7 We know enough to take important actions for a more sustainable development, but there is still need for more knowledge

It is evident from the preceding chapters and sections that considerable knowledge exists on issues relevant to a sustainable urban development. Nevertheless, there is still a need for more research. Within the domain of planning research, the knowledge is to a considerable degree contextual. It is therefore necessary to be cautious as to generalize research results from studies in one concrete situation, to situations that may differ significantly regarding e.g. economic, cultural and political conditions.

However, this does not mean that action should be postponed until certain knowledge is available. Such knowledge is likely never to appear within the research field in question. We are compelled to a situation of uncertainty to a higher or lower degree. The gravity of the environmental situation makes it necessary to act now on basis of our best available knowledge. An interpretation of the "precautionary principle" for ecologically defensible decisions could therefore be:

(1) Choose those courses of action that, based on today's status of knowledge, minimize the detrimental and irreversible impacts on nature and the environment,

and

(2) at the same time minimize the negative (detrimental and irreversible) consequences for nature and the environment if the basis of knowledge should prove to be erroneous.

In order to meet the requirements of planning for a sustainable development, the following issues should be given priority for future discussion and research:

1) Driving forces behind current urban development. Which interests are favoured when land use plans are framed? To what extent have land use changes in urban areas taken place according to municipal physical plans, and to what extent does reality deviate from what was planned? Which agents or interest groups are influential during the planning process? Do deviations between realized and planned physical environments show any particular pattern? What kinds of regards are emphasized when an adopted plan is being departed from?

In Norway, some research on these issues is currently being done. Results will be available within the end of 1994. However, it is desirable to gain experience from a range of different countries.

2) Physical and social impacts from density increases. There is a need to evaluate physical environmental changes in areas where density increases have taken place according to different degrees of planned control, different principles for grouping of new buildings in relation to the old ones, different entrance and parking solutions, etc. What are the measurable impacts, and how do the original inhabitants validate the result? It is also desirable with better knowledge about social aspects of density increases. How do the inhabitants judge the process of planning and implementation? Do density increases in established residential areas lead to changes in existing social networks? How are the attitudes among the original inhabitants to density increases and the new residents, and do changes occur as time goes by?

3) Land use and transportation. Although considerable research has already been carried out within this field, further empirical investigations are still required. A nearly finished Norwegian research project (c. chapter 3) will, in addition to focusing on the regional and whole-city level and on housing areas, investigate how the location of jobs influence employees' energy use for transportation. Studies in this field should also be carried out in other countries. Furthermore, there is a need of more studies to investigate the transport consequences of semi-rural shopping malls. Research should also be carried out to evaluate effects from various types of restrictions on car use in cities.

4) Welfare consequences from various urban developmental patterns. Experience should be gathered from different urban environments, focusing on the residents ' valuation of their physical environment, the levels of social contact among people, and the residents ' organizing of their daily routines. Do differences exist between residential areas with different location, density or design in other respects? How well satisfied are people in different residential areas with their everyday routines and the possibilities for social contact in the neighbourhood? Are possible differences primarily due to variations in the physical environments, or to differences in socio economic status?

5) The roles of urban green areas . How do urban citizens validate nature within and in the proximity of the city? How does the visiting of parks and other green areas vary between different population groups, and with the distance from residences to the park? Does the availability of parks and other green areas close to the dwelling influence residents ' opinions about environmental conservation?

6) Methods for environmental impact analyses of municipal land use plans. There is a need to develop and discuss methods for the evaluation of urban developmental alternatives against environmental criteria. Such methods could be developed along two lines: In part, methods suitable for more extensive, scientific elucidations should be refined. In part, simplified methods suitable for planners in ordinary municipal planning ought to be developed.

7) Evaluation of urban ecological experiments. A number of "urban ecological " experiments have been implemented in recent years, especially in Germany, the Netherlands, Denmark and Sweden. The experiments range from alternative housing design to new principles for the treatment of rainwater and "grey " water from the households. The alternative solutions have been derived from ecological theories, but few scientific evaluations of the actual environmental advantages have been carried out. Research should be carried out to investigate their consequences in a broad environmental context.

5. *Concluding remarks*

Towns and cities constitute important arenas for economic activity and production of welfare within their immediate spatial domains as well as in the wider regional context within which they interact in various ways with other towns and cities, and with their surrounding hinterlands. The challenge to policy and planning is to strengthen the welfare-producing capacity of urban regions in ways that are not at odds with the requirements of a sustainable development. Being the increasingly dominant places of population residence and of production and consumption of goods and services, urban areas represent the closest and most evident state of interdependence between economic, social and ecological systems. The worldwide challenge of sustainable development therefore to a large extent confronts urban areas.

In summing up, several propositions for discussion are made in the form of a qualified list of priority of areas for international research and policy development cooperation. The propositions are based on the crucial objectives and characteristics of a "sustainable pattern of urban development ", as specified in the document, and the identified basic conditions that must be met in order to achieve the objectives. The proposals concentrate on the spatial dimension of urban built environment and take into consideration the necessity to reconcile economic, welfare and environmental goals, mainly within the framework of presently available technology and organizational measures.

Since there is no single, authorized understanding of the concept of 'sustainability' there was a need to briefly discuss alternative interpretations in the context of the conference theme, in order to carefully account for the interpretation employed in the document.

To be able to establish operational criteria for discussing objectives and characteristics of a sustainable regional/spatial development of urban areas, a well-founded interpretation of the concept 'sustainable development' had to be developed and "translated" into operational planning objectives, based on empirical knowledge on the relevant elements in regional/spatial development. The elaboration of an operational interpretation took as guidelines the statements of the UN World Commission on Environment and Development and subsequent international recommendations and agreements, especially on the necessity of industrialized countries to significantly reduce energy use and harmful emissions. These guidelines are concretely related to research-based knowledge on how different patterns of land-use, spatial structures of built-up areas, types of functional-locational organization, and transport systems, affect energy use and emissions in urban regions (Mogridge 1985, Owens 1986, Newman & Kenworthy 1989, Næss 1993a).

On the above mentioned general and more specific background the document focuses on welfare and environmental aspects of the structure, status and evolution of European towns and cities in relation to regional development and planning. The point of departure is the need to achieve "compatibility of economy and ecology" in future urban development, in the sense that developments and shifts in the economy integrate with a long-term maintenance or improvement of the quality of eco-systems in ways which lead to a positive contribution to welfare (Nijkamp 1992). This implies i.a. that urban economic development will have to take place in relation to an urban environment designed to keep environmental impacts well within the limitations set by global sustainability considerations.

The proposals are based on the premise that urban environmental ambitions will have to include drastically reduced emissions, the saving of resources and a general easing of the burden on the environment, by spatially organizing settlement, production, consumption, transport and built environment in a way that positively modifies the agents of environmental deterioration (see i.a. Hahn and Simonis 1992).

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